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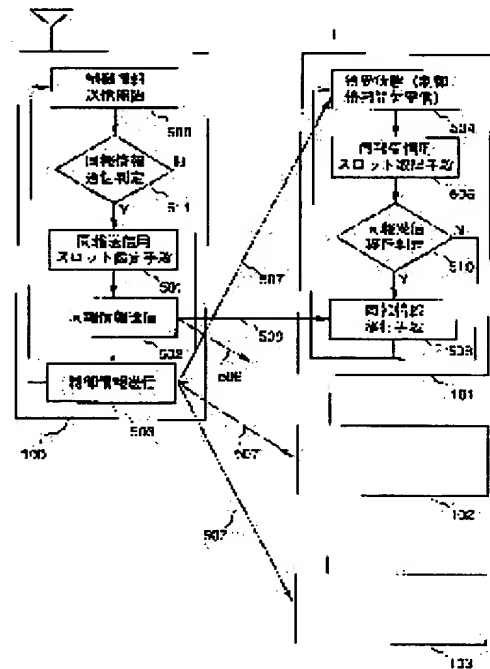
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## (54) MOBILE COMMUNICATION SYSTEM

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a mobile communication system in which a mobile station easily transits to a multiple address information reception state in a comparatively short time in the case of transmission / reception of the multiple address notice information and the mobile station requests specific multiple address information among multiple address service served by a base station in the mobile communication system.

**SOLUTION:** A base station 100 sends control information 507 through a specific slot on a control channel to plural mobile stations 101-103 and sends plural sets of multiple address information 508-509 to the mobile stations 101-103. In the mobile communication system as above, the base station 100 is provided with a multiple address transmission slot setting means 510 and in the case of multiple address transmission, a slot number used for multiple address transmission is set to the control information 507. Each of the mobile stations 101-103 is provided with a multiple address reception slot acquisition means 505 and a multiple address reception transit means 506, and in the case of receiving the control information 507 in a standby state 504, the slot number set therein is acquired and the multiple address is transited through the slot.



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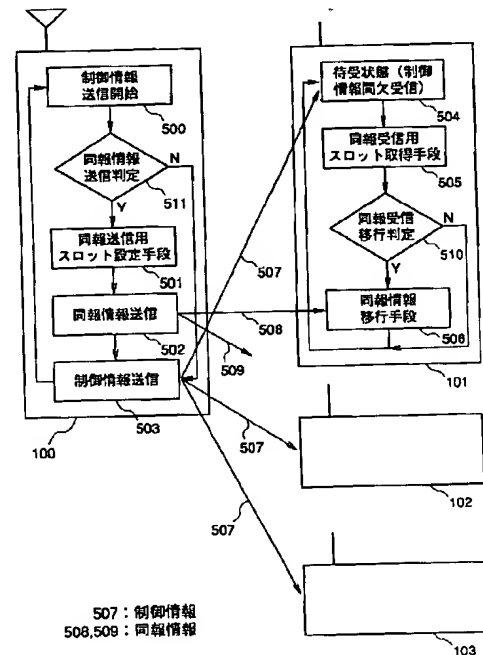
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(54) 【発明の名称】 移動通信システム

(57) 【要約】

【課題】 移動通信システムにおいて、同報情報の送受信の際には、移動局が比較的短時間で容易に同報情報受信状態に移行でき、また、移動局側が基地局が提供する同報サービスのうち特定の同報情報を要求する移動通信システムを提供すること。

【解決手段】 基地局100が複数の移動局101~103に対して制御チャネル上において制御情報507を特定のスロットにて送信するとともに、当該移動局に対し複数の同報情報508~509を送信することが可能な移動通信システムにおいて、基地局100に同報送信用スロット設定手段510を設け、同報送信時には制御情報507に同報送信時に使用しているスロット番号を設定する。移動局101~103には同報受信用スロット取得手段505と同報受信移行手段506を設け、待受状態504において、制御情報507を受信した時、そこに設定されているスロット番号を取得し、そのスロットにて同報受信に移行する。



## 【特許請求の範囲】

【請求項 1】 基地局が一移動局もしくは複数の移動局に対して制御チャンネル上において制御情報を特定のスロットにて送信するとともに、当該移動局に対して、制御チャンネルの複数のスロットにて複数の同報情報を送信する移動通信システムであって、

上記基地局は、同報情報を送信しているスロット番号を、上記制御情報の中に設定する手段を備え、  
上記移動局は、上記制御情報中に上記基地局により設定された、上記同報情報を送信しているスロット番号を読み出し、受信するスロット列中の当該番号のスロットにて上記基地局が送信している上記同報情報を受信する手段を備えたことを特徴とする移動通信システム。

【請求項 2】 請求項 1 記載の移動通信システムにおいて、

上記移動局は、上記基地局が提供する複数の同報情報の中から所望のものを選択し、上記基地局に対して、制御チャンネル上で上記選択した所望の同報情報を要求する手段を備え、

上記基地局は、上記所望の同報情報に対応するスロット番号を上記制御情報中に設定する手段を備えたことを特徴とする移動通信システム。

【請求項 3】 基地局が一移動局もしくは複数の移動局に対して制御チャンネル上において制御情報を特定のスロットにて送信するとともに、通信チャンネル上で当該移動局に対して複数のスロットにて複数の同報情報を送信する移動通信システムであって、

上記基地局は、同報情報を送信しているスロット番号を、通信に使用可能な有効スロットに設定する手段を備え、

上記移動局は、上記通信に使用可能な有効スロットを検索してこれを受信した時、該有効スロット中に設定された上記同報情報を送信しているスロット番号を読み出し、受信するスロット列中の当該番号のスロットにて上記基地局が送信している上記同報情報を受信する手段を備えたことを特徴とする移動通信システム。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は移動通信システムに関し、特に、無線局間で同報通信を行うことが可能な移動通信システムに関するものである。

## 【0002】

【従来の技術】 近年、高度情報化が進む中、即時性と機能性に優れた移動通信システムが注目され、携帯電話、自動車電話、MCA (Multi-Channel Access) 無線等々が種々な形態でもって実現されている。更に、日本では 1995 年から「いつでも、どこでも、誰とでも」の通信を可能にする理想的な移動通信システムである PHS (パーソナルハンディホンシステム；第二世代のコードレス電話のこと) のサービスが開始された。一方、米国

でも PCS (Personal Communications Service) の標準化作業が進行している。PCS は早ければ 1997 年にもサービスの開始が予定されているパーソナル通信サービスで、従来のセルラー電話等の無線電話に比較して、ユーザが低コストで既存の PSTN (Public Switched Telephone Network : 公衆電話交換網) 等の通信網にアクセスすることを可能とし、データベースへのアクセスなどのサービスを容易に利用できるように設計されたもので、現在 7 種類のインタフェースが採用される予定である。その中で有力視されているインタフェースが PACS (Personal Access Communication System) である。PACS は Bellcore 社が開発した WACS (Wireless-Access-Communication System) と日本の PHS を基に設計されたものであり、無線周波数帯としては 1.9 GHz 帯が、周波数間隔としては 300 kHz が使用され、またアクセス方式としては TDMA (Time Division Multiple Access: 時分割多元接続) 方式、伝送方式としては FDD (Frequency Division Duplex: 周波数分割) 方式、変調方式としては DQPSK (Differential Quadrature Phase Shift Keying) 方式が使用されるようになっており、小セルで移動性が低い応用向けのものとして、低コストで実現することを狙ったものである。

【0003】 ところで、移動通信システムを運用する上で、文字放送等のように複数の移動局に対して、基地局から同時に同一内容を送信したい場合がある。このような場合には、いわゆる同報通信方式を利用することになる。かかる同報通信方式の例として、特開平 7-107032 号には、主局 (基地局) が従局 (移動局) からの同報通話の要求を受けた場合に、グループ内の全ての従局 (即ち、該主局が受け持つ無線ゾーン内においてその位置が登録され、移動通信に供される従局の全てであり、各従局には、各々識別番号が付与されている) に対して同報通話信号を無線中継する技術が開示されている。図 8 (a) は該公報に記載された、レイヤ 3 レベルでプロトコルのやりとりを行う無線通信システムの同報通信制御シーケンスを示す図である。

【0004】 以下、図に基づいて従来の移動通信システムの同報通信制御動作について説明する。基地局 1 は移動局 21~23 からの同報開始要求 3 を受けると、空きチャンネルを調べて同報通信に使用するチャンネルとして例えばチャンネル CH1 を設定し、グループ識別番号 G11 を含むチャンネル移行指示信号 4 を各移動局 21~23 に送信する。各移動局は、指定されたチャンネル CH1 で基地局 1 との通信が可能な場合 (ここでは移動局 21, 22 がこれに該当するものとする) には、自分の通信チャンネルをそのチャンネル (CH1) に切り替えて、チャンネル移行完了信号 51, 52 を基地局 1 に送信する。一方、指定されたチャンネル (CH1) では基地局 1 との通信が不可能な場合 (ここでは移動局 23 が該当する) には、

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チャネル移行失敗信号53を基地局1に送信する。基地局1はグループG11に属する全ての移動局21~23からチャネル移行完了信号71~73が得られるまでチャネル移行指示6を繰り返して送信し、全ての移動局21~23のチャネルの移行が確認されると、同報通信を行うためにデータ8の送信を開始する。

【0005】図8(b)は上記基地局1と移動局21~23との間でやりとりされる信号のフォーマットの例を示し、ここでは、1周期を8つに分割(分割された1つをスロットと言う)し、前半の4つを上り(移動局から基地局へ)の方向)、後半の4つを下り(基地局から移動局へ)の方向)として用い、フォーマットの定められた単一の周波数の信号を基地局と移動局との間でやりとりするものとなっている。

【0006】

【発明が解決しようとする課題】しかしながら、上述した同報通話方式では、同報通信時は同報通信を行うために1つの周波数の信号を用いて基地局と移動局との間でシーケンス制御を行うレイヤ3レベルでプロトコルをやりとりしなければならず、使用される信号の周波数が1つであるため、上りと下りで周波数の異なる2種類の信号を用いるPCS方式と比較して信号のやりとり回数が多くなり、その分、通信に多くの時間を要することになる。また、上記プロトコルでは、発呼、着呼、位置登録等のために予め予約されているスロットが多く、未使用のスロットが少ないため、移動局からは同報通信の要求はできても、移動局側で特定のサービスを指定して同報情報を基地局側から送信するように要求することはできない。さらにPCS方式では、上り、下りで異なる周波数を用いた通信が行われるが、現在のところ空きスロットをどのように使用するかという規定が無く、また該方式では同報通信を行うという概念はないものであった。

【0007】本発明は、かかる現状に鑑みてなされたものであり、基地局と移動局との間での通信効率を向上できる移動通信システムを得ることを目的とする。

【0008】また、移動局側で特定のサービスを指定して、これを同報通信にて受信することができる移動通信システムを得ることを目的とする。

【0009】

【課題を解決するための手段】上記目的を達成するために、請求項1にかかる発明は、基地局が一移動局もしくは複数の移動局に対して制御チャネル上において制御情報を特定のスロットにて送信するとともに、当該移動局に対し制御チャネルの複数のスロットにて複数の同報情報を送信する移動通信システムであって、基地局が、同報情報を送信しているスロット番号を、上記制御情報の中に設定する手段を備え、移動局が、上記制御情報の中に上記基地局により設定された上記同報情報を送信しているスロット番号を読み出し、受信するスロット列中の当該スロット番号にて上記基地局が送信している上記同

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報情報を受信する手段を備えたものである。

【0010】また、請求項2にかかる発明は、上記移動通信システムにおいて、移動局が、基地局が提供する複数の同報情報の中から所望のものを選択し、上記基地局に対して、制御チャネル上で上記選択した所望の同報情報を要求する手段を備え、基地局が上記移動局が所望とする同報情報に対応するスロット番号を上記制御情報中に設定する手段を備えたものである。

【0011】また、請求項3にかかる発明は、基地局が一移動局もしくは複数の移動局に対して制御チャネル上において制御情報を特定のスロットにて送信するとともに、通信チャネル上で当該移動局に対し複数のスロットにて複数の同報情報を送信する移動通信システムであって、基地局が、同報情報を送信しているスロット番号を、通信に使用可能な有効スロットに設定する手段を備え、上記移動局が、上記通信に使用可能な有効スロットを検索してこれを受信した時、該有効スロット中に設定された上記同報情報を送信しているスロット番号を読み出し、受信するスロット列中の当該番号のスロットにて上記基地局が送信している上記同報情報を受信する手段を備えたものである。

【0012】

【発明の実施の形態】

実施の形態1. 図1(a)は、本発明の実施の形態1.における移動通信システムの構成を示すブロック図である。図1において、基地局100の無線ゾーン104内には、例えば3つの移動局101~103が配置されている。基地局100は、伝送路を介して通信網105と接続されている。また、基地局100と移動局101~103との間の通信には、双方向の時分割多元接続方式(TDMA)を用いたデジタル通信が採用されている。以後、説明の便宜上、基地局100から移動局101~103への方向を下り(downlink)、移動局101~103から基地局100への方向を上り(uplink)と表現する。

【0013】次に基地局と移動局との間での概略的な動作について説明する。いま、図1では基地局100と移動局101が通信をしているものとする。ここで、下りの通信キャリアの周波数は $f_1$ であり、上りの通信キャリアの周波数は $f_2$ である。すなわちFDD方式では、下りと上りのキャリアの周波数には一定の差が設けられており、基地局100では下りのキャリアを周波数 $f_1$ で送信した後、周波数を切り替えて上りのキャリアを周波数 $f_2$ で受信するように構成されている。移動局101では下りのキャリアを周波数 $f_1$ で受信した後、周波数を切り替えて上りのキャリアを周波数 $f_2$ で送信する。この場合のスロット番号は同じ $s_1$ である。

【0014】これら周波数とスロットの関係を示したのが図1(b)の300及び310である。300は基地局100から見た移動局101~103に対するスロット

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(スロット列)であり、310は移動局101から見た基地局100に対するスロット(スロット列)である。107はスロット(slot)5を示しているが、このスロット5は制御情報を送信する特定のスロットである。移動局102~103は基地局100からの制御情報を周波数f1の下りの通信キャリアのスロット番号s5で受信している。109は基地局100が移動局101との通信で使用しているスロット番号1(アイドル用スロット)である。この位置は移動局101から見ても同じである。その他のスロットに、通信に使用可能なものとして開放された有効スロット108がある。この有効スロット108と、制御用のスロット107と、通信中のスロット109と、それ以外の有効でないスロット(未使用ではあるが、通信に開放されていないスロット)であり、スロット列300ではスロット0、2、4、6、7に相当)とはユニークコードで区別することができる。図2の200に各ユニークコードの関係を記す。移動局が基地局と通信するためにリンク確立を行う場合、移動局が基地局のスロット0~7を連続受信して、ユニークコードを見て通信可能な有効スロットを探す。この通信に有効なスロットを探したタイミングで、以後移動局は間欠送受信を行う。リンク確立が成功した後

は、基地局も当該スロットに対し間欠送受信を行う。  
【0015】図3は、図1に示す基地局100のより詳細な構成を示すブロック図である。図3において、基地局は、回線制御部110と、変調部111と、入力部112と、通信制御部113と、無線制御部114と、出力部115と、復調部116と、アンテナ117とを備えている。以下詳述すると、上記回線制御部110は、通信網105と通信制御部113との間に挿入され、回線の接続状態や切り替えを制御する。上記通信制御部113は、CPU、ROM、RAM等を含み、本発明の同報通信制御を行う。上記入力部112は、キーボード、マイクロフォン等によって構成され、データや音声を通信制御部113に入力する。上記出力部115は、磁気ディスク装置、ディスプレイ装置、スピーカー等によって構成され、上記通信制御部113から出力されるデータを、記憶、表示、音声出力等をする。上記変調部111は、通信制御部113から出力される送信データを、所定の方式で変調、例えば、 $\pi/4$ シフトDQPSK変調し、無線制御部114に出力する。この無線制御部114は、変調部111から与えられる変調データを搬送波に乗せてアンテナ117から送信する機能と、アンテナ117に誘起した高周波信号の中から所定の周波数帯の信号を受信する機能とを有する。上記復調部116は、無線制御部114によって受信された信号を復調して通信制御部113に与える。

【0016】図4は、図1に示す移動局のより詳細な構成を示すブロック図である。図4において、移動局は、変調部121と、入力部120と、通信制御部123

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と、無線制御部124と、出力部125と、復調部126と、アンテナ127とを備えている。以下詳述すると、上記通信制御部123は、CPU、ROM、RAM等を含み、本発明の同報通信制御を行う。上記入力部120は、キーボード、マイクロフォン等によって構成され、データや音声を通信制御部123に入力する。上記出力部125は、磁気ディスク装置、ディスプレイ装置、スピーカー等によって構成され、通信制御部123から出力されるデータを、記憶、表示、音声出力等する。上記変調部121は、通信制御部123から出力される送信データを、所定の方式で変調、例えば、 $\pi/4$ シフトDQPSK変調し、無線制御部124に出力する。この無線制御部124は、変調部121から与えられる変調データを搬送波に乗せてアンテナ127から送信する機能と、アンテナ127に誘起した高周波信号の中から所定の周波数帯の信号を受信する機能とを有する。上記復調部126は、無線制御部124によって受信された信号を復調して通信制御部123に与える。

【0017】そして以上の構成において、基地局100の通信制御部113を構成するCPUを用いて、同報情報を送信する際に制御情報中に当該同報情報を送信しているスロット番号を設定する機能を実現し、また移動局の通信制御部123を構成するCPUを用いて、上記制御情報中に上記基地局により設定された上記同報情報を送信しているスロット番号を読み出す機能を実現することにより、同報通信の際に基地局100側から送信された同報情報を送信しているスロット番号を、移動局側101~103にて検知し、これにより同報情報の受信を行うことができる。

【0018】また、上記構成において、上記移動局101~103側の通信制御部123を構成するCPUを用いて、特定の同報情報を選択して、これを指定する同報情報指定情報を基地局100に対して送出することができる。基地局100の通信制御部113を構成するCPUを用いて、移動局101~103側から送信される同報情報指定情報に基づき、指定された同報情報のスロット番号を制御情報中に設定する機能を実現することにより、移動局101~103側から基地局100側に対して、特定の同報情報の送信を要求するとともに、基地局100側で該特定の同報情報を送信することが可能となる。

【0019】また、さらに、基地局100の通信制御部113を構成するCPUを用いて、同報情報の送信に使用するスロット番号を、制御スロットに代えて有効スロットに設定して送信する機能を実現し、移動局101~103の通信制御部123を構成するCPUを用いて、同期確立時に通信に、使用可能な有効スロットを検索してこれを受信した際には、該有効スロット中に設定された上記同報情報を送信しているスロット番号を読み出し、受信するスロット列中の当該番号のスロットにて上

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記送信されている同報情報を受信する機能を実現することにより、発呼等の際に、既に送信されている同報情報があれば、これを優先的に受信することが可能となる。

#### 【0020】

##### 【実施例】

実施例 1. 以下、本発明の実施例 1. による移動通信システムを図面を用いて説明する。図 5 は、本発明にかかる移動通信システムの実施例 1. を示す構成図である。これは、基地局 100 が複数の移動局 101~103 に対して制御チャネル上において制御情報 507 を特定の 10 スロットにて送信するとともに、当該移動局に対して制御チャネルの複数のスロットにて複数の同報情報 508, 509 を送信することが可能な移動通信システムの構成となっている。基地局 100 には同報送信用スロット設定手段 510 を備えており、一方、移動局 101~103 にはそれぞれ同報受信用スロット取得手段 505 と、同報受信移行手段 506 とを備えている点が、本実施例 1. の特徴である。

【0021】 続いて、この移動通信システムにより、同報情報を送受信する場合の具体的な制御動作について説明する。基地局 100 は制御情報 507 を特定のスロット (slot 5) で常に送信する。なお、移動局 101~103 は制御情報 507 が特定のスロット (slot 5) で送信されることを事前に知っているものとする。この制御情報 507 は通常、図 2 (a) の 200 に示されるようなフォーマットを有しており、その先頭には、将来の機能拡張のために設けられているリザーブビット (0) と、ユニークコードと呼ばれる識別用のコードとが設定されており、このユニークコードは例えば図 2 (d) に示されるように、制御スロットは (111001 30 0)、通信可能な有効スロットは (1011000)、通信中のスロットは (0100111)、通信に有効でないスロットは (0001101) というように決められている。そしてこの制御情報 507 には、これが着信 (基地局側からの信号が移動局に受信されること) に用いられる際には、着信すべき移動局の番号や、基地局 100 が持っている特有の制御情報が設定される。今、基地局 100 が別の空いているスロット (slot 1) で同報情報 508 を送信し、slot 7 で別の同報情報 509 を送信しているものとする。ここで、移動局 101~103 は、制御情報 507 が特定スロット (slot 5) で送信されることは知っているが、その他の同報情報 508, 509 がどのスロットで送信されているかはこれを知る手段がない。

【0022】 そこで、基地局 100 は同報情報送信開始 500 の後に、同報情報が送信されているか否かの判定を行い (ステップ 511)、同報情報が送信されていると判定された場合は、同報送信用スロット設定手段 501 により、制御情報 507 中に同報情報 508, 509 がどのスロットで送信されているかを設定する。その場 50

合の制御情報 507 は、図 2 (b) の 201 に示されるようなフォーマットを有する。すなわち、そのユニークコードとしては制御スロットのユニークコード (1110010) を用いるとともに、図 2 (a) の 200 に示されるような他の制御情報等と区別できるよう、制御情報領域 2 に、サービス種別コードの数等を示す同報用スロット情報要素種別 1 と、該サービス種別コードの長さを示す同報用スロット情報要素 1 内容長との対を記入した上で、種類の異なる各同報情報サービス毎にそれぞれ異なるスロット番号を設定する。そして、基地局 100 は当該スロットにて同報情報送信 502 を行い、制御情報送信 503 も特定スロット (slot 5) で行う。

【0023】 一方、移動局 101 は制御情報を間欠受信している待受状態 504 において、制御情報 507 として、上記制御スロットのユニークコード (1110010) を有し、かつその中でも図 2 (b) の 201 に示されるような同報用スロット情報要素種別 1 を有するものを検出した場合には、同報受信用スロット取得手段 505 により、基地局 100 が同報情報を送信していると判断し、該制御情報 507 中に設定されている同報受信用のスロット (slot 1, slot 7) を取得する。そして同報受信移行時であると判定されると (ステップ 510)、移動局 101 は、同報情報移行手段 506 によって同報情報を受信可能な状態となり、上記取得した当該スロット番号のうちの任意のスロット (例えば slot 1) により同報情報 508 を受信する。またこの時、移動局 102, 103 は通常通り制御情報 507 の受信を続行する。

【0024】 このように本実施例 1. によれば、基地局 100 に同報送信用スロット設定手段 501 を備え、移動局 101~103 にそれぞれ同報受信用スロット取得手段 505、同報受信移行手段 506 を備えたものとし、PCS 方式において同報通信を行うために、基地局 100 から常時特定のスロット (slot 5) で制御情報 507 を送信するとともに、この制御情報 507 の中に同報情報 508, 509 を送信しているスロット番号 (slot 1, slot 7) を設定し、移動局 101~103 において、この制御情報の中に設定された同報情報を送信しているスロット番号を読み出し、このスロット番号にて同報情報を受信するようにしたから、基地局 100 から複数の移動局 101~103 に対して複数の同報情報を提供し、これを移動局 101~103 にて受信することができ、基地局 100 と移動局 101~103 との間での通信効率を向上することができ、実用的に大きな効果が得られる。

【0025】 実施例 2. 次に本発明の実施例 2. による移動通信システムについて説明する。図 6 は、本発明にかかる移動通信システムの実施例 2. を示す構成図である。これは、基地局 100 が複数の移動局 101~103 に対して制御チャネル上において制御情報 507 を特

定のスロットにて送信するとともに、制御チャネルの複数のスロットにて当該移動局に対して複数の同報情報 604、605 を送信することが可能な移動通信システムの構成となっている。基地局 100 には同報送信用スロット選択手段 600 を備えており、移動局 101~103 にはそれぞれ同報情報指定兼スロット取得手段 601 を備えている点が、本実施例 2. の特徴である。

【0026】続いて、この移動通信システムにより、同報情報を送受信する場合の具体的な制御動作について説明する。移動局 101 は基地局 100 が提供するいくつかの同報情報を指定できる手段を有する。すなわち、同報情報指定兼スロット取得手段 601 により、基地局 100 に対して同報情報指定情報 602 を送信する。この場合の同報情報指定情報 602 は図 2(c) の 202 に示されるようなフォーマットを有する。すなわち、そのユニークコードは、同報通信のスロットであることを示すユニークコード (1110011) とするとともに、制御情報領域 2 に、サービス種別コードの数等を示す同報用スロット情報要素種別 2 と、該サービス種別コードの長さを示す同報用スロット情報要素 2 内容長との対を記入した上で、移動局 101 が受信したい 1 つ以上の同報情報の種別コード (サービス種別コード) を設定したものである。基地局 100 は移動局 101 からの同報情報指定情報 602 を受信した場合、ステップ 511 で、その時既に移動局 101 より指定された同報情報を送信しているものと判定された場合は、同報送信用スロット選択手段 600 により、当該同報情報のスロット番号を制御情報 507 に設定する。一方、ステップ 511 で移動局 101 により指定された同報情報を送信していないものと判定された場合には、同報送信用スロット選択手段 600 により、移動局 100 側から指定された同報情報を使用可能なスロット番号にて送信するとともに、当該同報情報のスロット番号を制御情報 507 に設定する。

【0027】以降、基地局 100 からは、移動局 101 から要求され、該基地局 100 から送信する同報情報 604 のスロット番号を設定してなる制御情報 507 が送信され、移動局 101 では、これを受けて同報情報指定兼スロット取得手段 601 により上記制御情報 507 の中に設定された同報情報のスロット番号を取得し、同報受信移行時であると判定されると (ステップ 606)、同報情報指定情報 602 で要求した通りの同報情報を受信することができる。

【0028】このように本実施例 2. によれば、基地局 100 に同報送信用スロット選択手段 600 を備え、移動局 101~103 に同報情報指定手段 601 を備えたものとし、ユーザの要求等により移動局から、特定の同報情報を送信するよう要求があった場合に、基地局 100 においては同報送信用スロット選択手段 600 がスロット番号を制御情報 507 中に設定して、要求された同報情報を送信するようにしたから、基地局 100 と移動

局 101~103 との間での通信効率を向上できると共に、移動局 101~103 側から特定のサービスの同報情報の送信の要求があった際には、これを要求通りに送信することができ、実用的に大きな効果が得られる。

【0029】実施例 3. 次に本発明の実施例 3. による移動通信システムについて説明する。図 7 は、本発明にかかる移動通信システムの実施例 3. を示す構成図である。これは、基地局 100 が複数の移動局 101~103 に対して制御チャネル上において制御情報 507 を特定のスロットにて送信するとともに、通信チャネル上で当該移動局に対して複数のスロットにて複数の同報情報 508、509 を送信することが可能な移動通信システムの構成となっている。基地局 100 には有効スロット設定手段 700 を備えており、移動局 101~103 にはそれぞれ有効スロット取得手段 703 を備えている点

が、本実施例 3. の特徴である。

【0030】続いて、この移動通信システムにより、同報情報を送受信する場合の具体的な制御動作について説明する。本実施例 3. のように、通信チャネル上で同報情報を送信する場合においては、有効スロットは必ずしも特定のスロット番号で基地局 100 から送信されているわけではない。従って、同期確立等で通信を行う必要がある場合は、連続受信にて有効スロットが存在するスロット番号位置を知る必要がある。

【0031】即ち、移動局 101 の発呼等により移動局 101 と基地局 100 との間で同期確立を行う必要が生じた場合、移動局 101 は、基地局 100 が通信キャリア上に送信している複数のスロットの中から、そのユニークコードを見て、通信可能な有効スロット 701 を検索する (ステップ 702)。この場合、検索すべき有効スロット 701 は、ユニークコードとして、図 2(d) に示される通信可能な有効スロットのユニークコード (1011000) を有し、かつ図 2(a) の 200 に示されるようなフォーマットを有するものである。

【0032】さて、基地局 100 は同報情報 508、509 を送信していると判定した場合 (ステップ 511)、有効スロット設定手段 700 にて通信キャリア上の有効スロット 701 の中に、同報情報送信 502 で使用しているスロット番号を、図 2(b) の 201 に示すように、サービス種別コードとスロット番号の対を記入することによって設定する。これにより、この場合の有効スロット 701 は、図 2(b) の 201 に示されるようなフォーマットを有するものとなる。但し、ユニークコードは、上述したように、通信可能な有効スロットのユニークコードの値 (1011000) を有するものである。

【0033】これに対し、移動局 101 は、上述したように、同期確立において基地局 100 から送信された上記有効スロット 701 を受信することにより、同報情報 508、509 を受信することができる。すなわち、移



動局 101 は同期確立要求時には有効スロット取得手段 703 によって、上記有効スロット 701 の中に同報情報を送信しているスロット番号が、図 2 (b) に示されるサービス種別コードとスロット番号との対の形で設定されていれば、この同報情報受信用のスロット番号を取得した後、同報受信に移行するか否かを判定し (ステップ 704)、同報受信移行手段 506 によって同報受信に移行し、同報受信することが可能となるものである。

【0034】このように本実施例 3. によれば、基地局 100 に有効スロット設定手段 700 を備え、移動局 101 ~ 103 にそれぞれ有効スロット取得手段 703 を備えたものとし、基地局 100 は、有効スロット 701 に同報情報送信で使用しているスロット番号を設定して送信を行い、移動局 101 の発呼等で基地局 100 と同期確立を行う必要が生じた場合に、まず、移動局 101 は有効スロットを検索し、これを受信した際には該有効スロット中に設定された、同報情報を送信しているスロット番号を有効スロット取得手段 703 にて取得し、受信するスロット列中の当該番号のスロットにて、基地局 100 が送信している同報情報 508, 509 を受信するよう構成したから、基地局 100 と移動局 100 ~ 103 との間での通信効率を向上することができるとともに、発呼等の基地局 100 との同期確立時に、同報通信が送信されていた場合に、これを優先的に受信することができ、自局にとって有用な情報を効率的に受信することができ、移動局のためのサービス向上を図る上で有効な手段となる。

【0035】なお、上記実施例では、本発明を PACS 方式に適応した場合について説明したが、本発明はこの形式に限られるものではなく、アクセス方式が TDMA 方式であれば他の方式のものであっても適用することができる。

#### 【0036】

【発明の効果】以上のように、本発明にかかる移動通信システムによれば、基地局が制御チャネルもしくは通信チャネル上の空きスロットで複数の同報送信を行い、配下の移動局がユーザの要求等により制御チャネル上の制御情報、もしくは通信チャネル上の通信可能な有効スロット情報より同報情報を受信するためのスロット番号を取得して同報情報の受信を行うことが可能であり、また、移動局側が基地局に対し特定のサービスの同報情報を要求し、基地局側から当該同報情報に対応するスロットを通知することが可能であるような移動通信システムを得ることができる。

#### 【図面の簡単な説明】

【図 1】 本発明にかかる移動通信システムの構成を示

すブロック図、及び基地局と移動局との間で使用される周波数とスロットの関係を示す図である。

【図 2】 基地局から、もしくは移動局から同報通信に移行するための各制御情報の内容を示す図である。

【図 3】 本発明にかかる移動通信システムの基地局のより詳細な構成を示すブロック図である。

【図 4】 本発明にかかる移動通信システムの移動局のより詳細な構成を示すブロック図である。

【図 5】 本発明にかかる移動通信システムの実施例 1. を説明するための図である。

【図 6】 本発明にかかる移動通信システムの実施例 2. を説明するための図である。

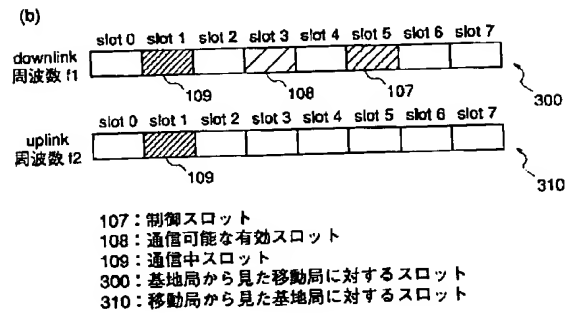
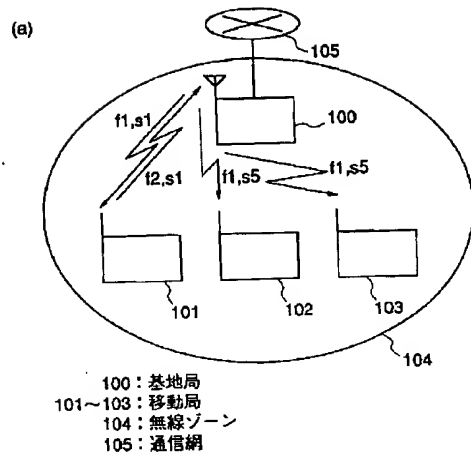
【図 7】 本発明にかかる移動通信システムの実施例 3. を説明するための図である。

【図 8】 従来の移動通信システムの同報通信制御シーケンス、及び基地局と移動局との間でやりとりされる信号のフォーマットを示す図である。

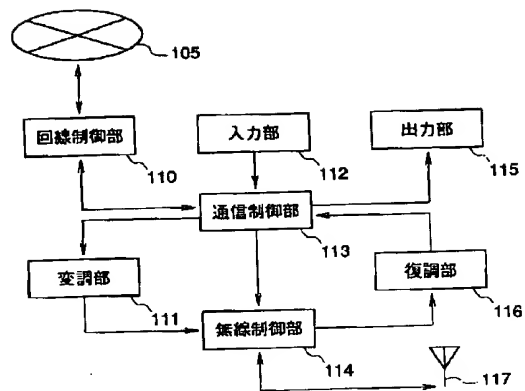
#### 【符号の説明】

100...基地局、101~103...移動局、104...無線ゾーン、105...通信網、107...制御スロット、108...通信可能な有効スロット、109...通信中スロット、110...基地局の回線制御部、111...基地局の変調部、112...基地局の入力部、113...基地局の通信制御部、114...基地局の無線制御部、115...基地局の出力部、116...基地局の復調部、117...基地局のアンテナ、120...移動局の入力部、121...移動局の変調部、123...移動局の通信制御部、124...移動局の無線制御部、125...移動局の出力部、126...移動局の復調部、127...移動局のアンテナ、200...制御情報、201...制御情報、202...制御情報、300...基地局から見た移動局に対するスロット (列)、310...移動局から見た基地局に対するスロット (列)、500...制御情報送信開始、501...同報送信用スロット設定手段、502...同報情報送信、503...制御情報送信、504...待受状態、505...同報受信用スロット取得手段、506...同報受信移行手段、507...制御情報、508, 509...同報情報、510...同報受信移行判定ステップ、511...同報情報送信判定ステップ、600...同報送信用スロット選択手段、601...同報受信移行手段、602...同報情報指定情報、604, 605...同報情報、606...同報受信移行判定ステップ、700...有効スロット設定手段、701...通信可能な有効スロット、702...同期確立要求時有効スロット検索、703...有効スロット取得手段、704...同報受信移行判定ステップ。

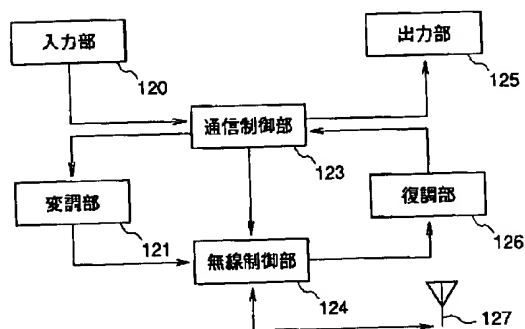
【図 1】



【図 3】



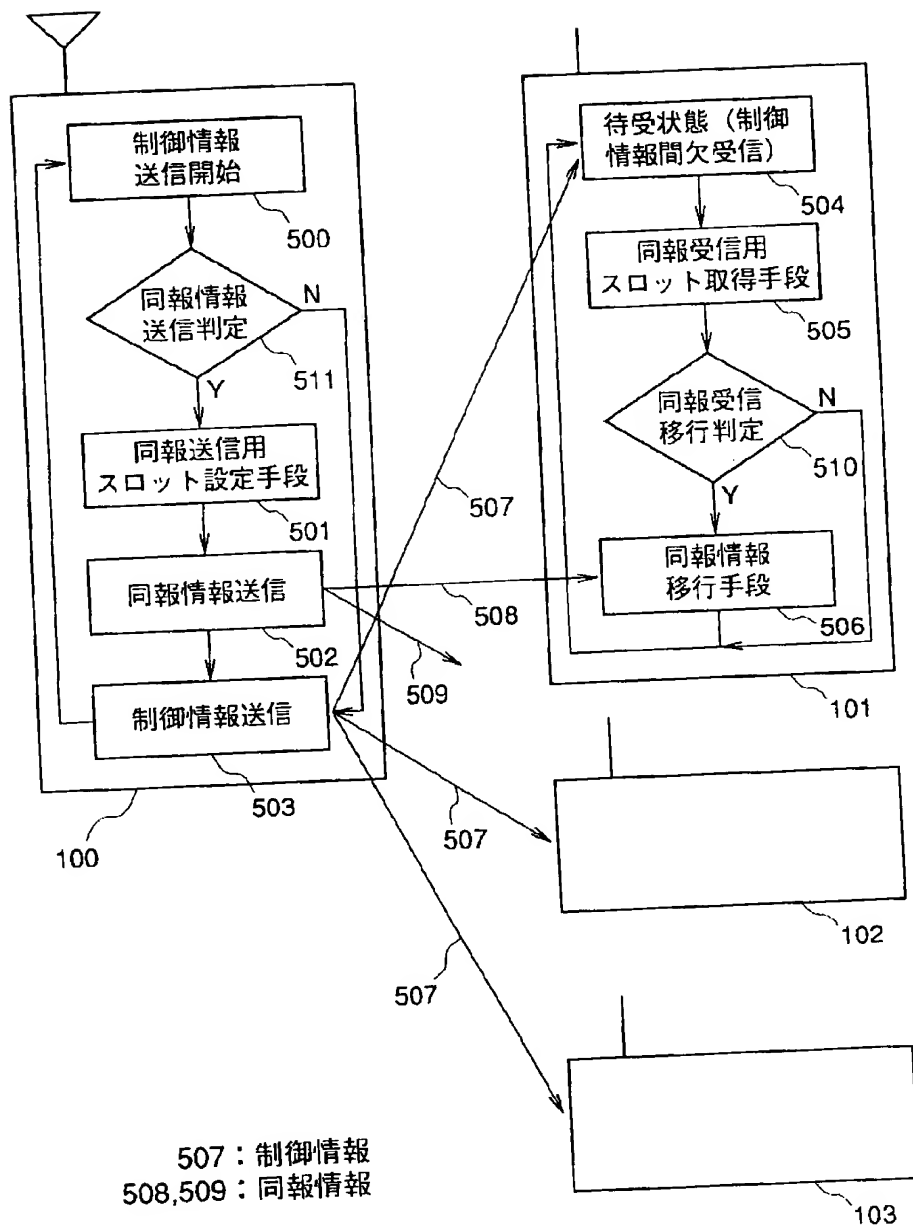
【図 4】



【図 2】

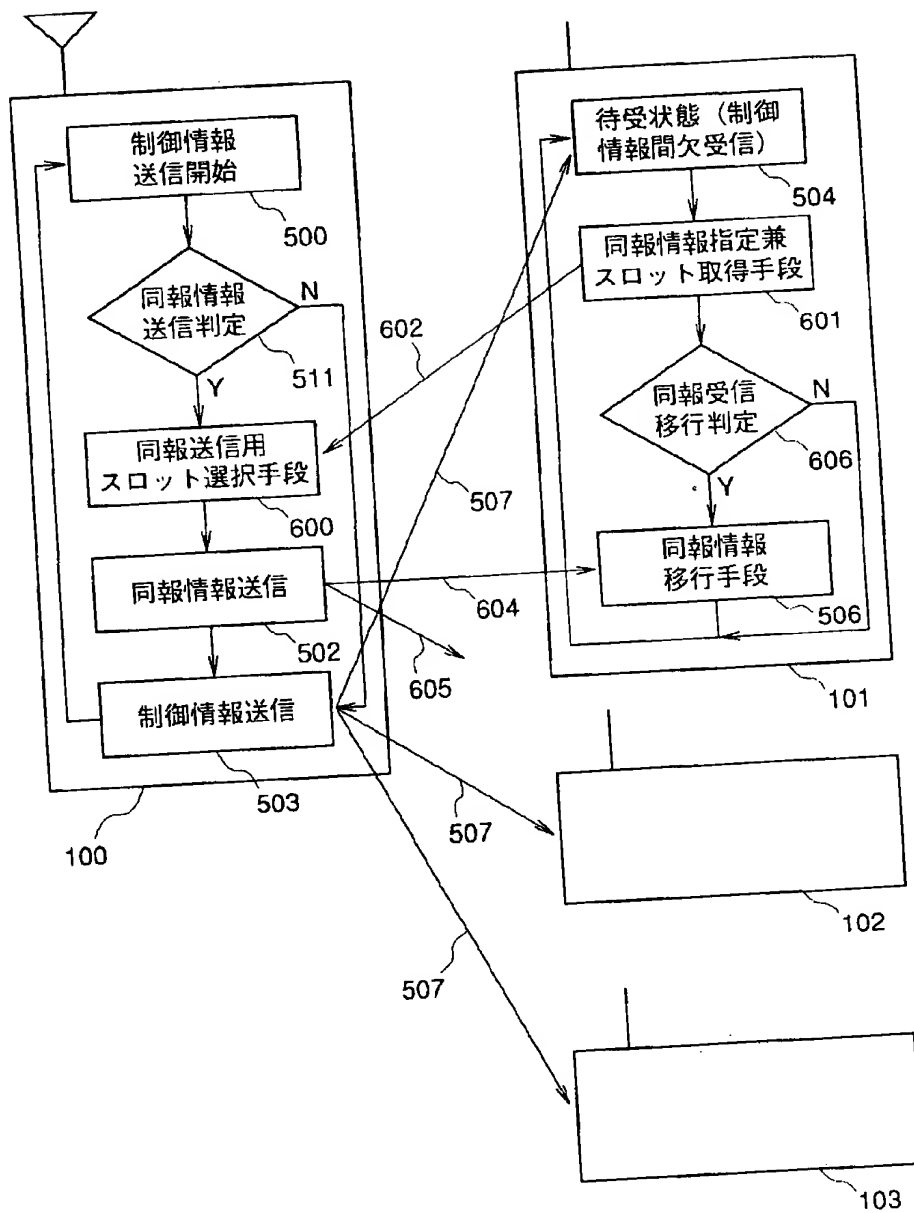


【図5】

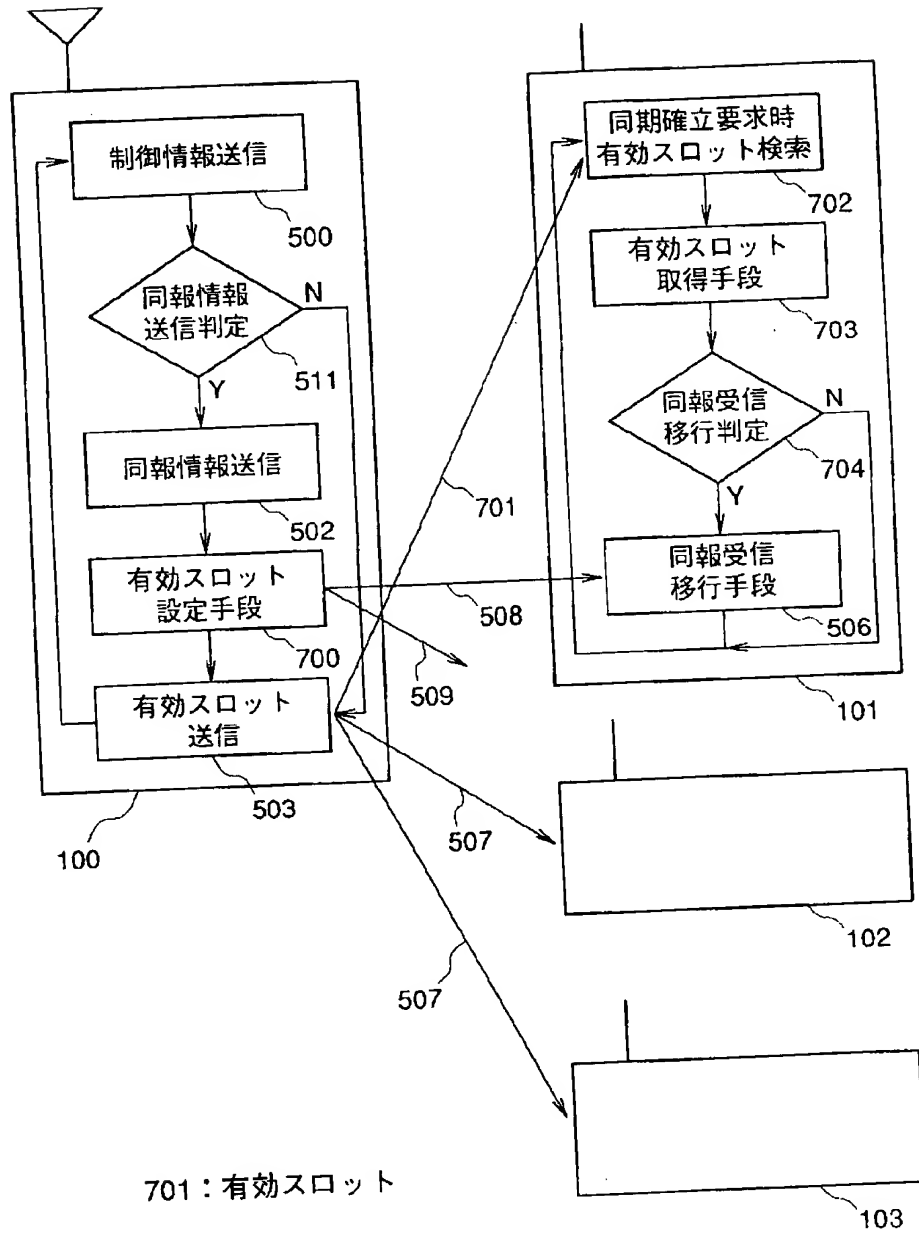


(11)

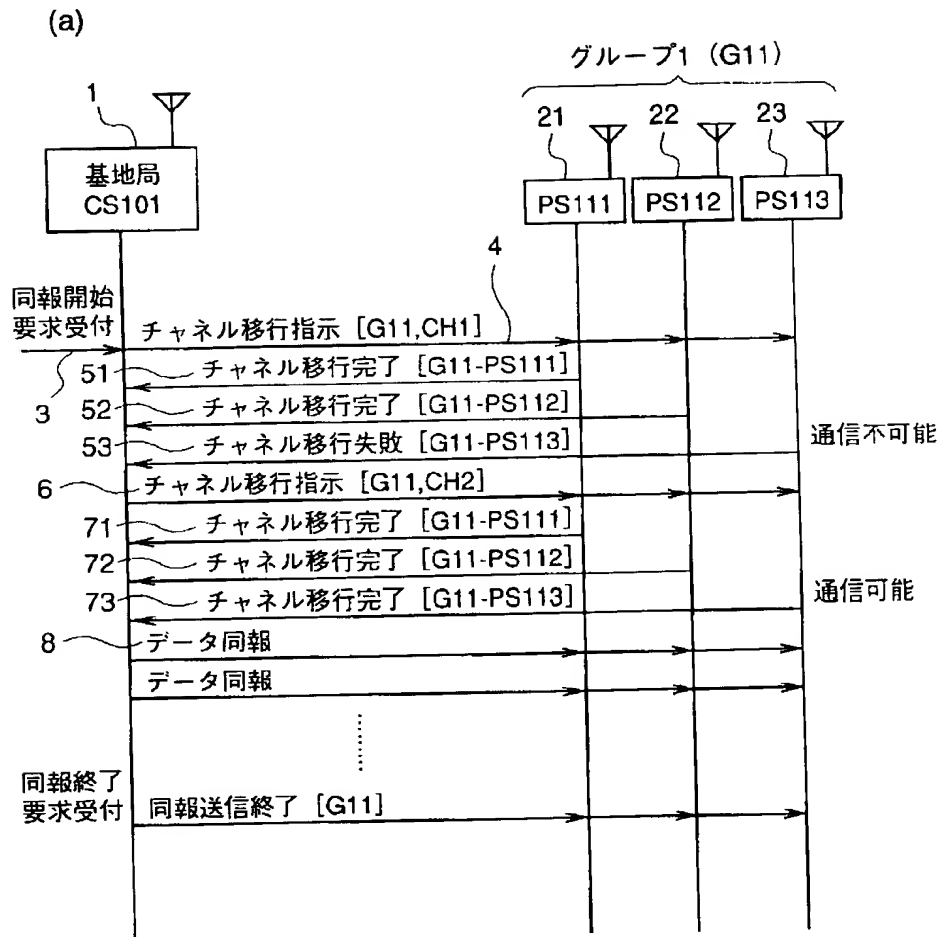
【図 6】



【図7】



【図8】



(b)



フロントページの続き

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**CLAIMS**


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[Claim(s)]

[Claim 1] Migration communication system characterized by providing or including the following It is a means to set up the slot number to which it is the migration communication system which transmits two or more broadcast information in two or more slots of a control channel to the mobile station concerned while a base station transmits control information in a specific slot on a control channel to one mobile station or two or more mobile stations, and the above-mentioned base station has transmitted broadcast information into the above-mentioned control information. The above-mentioned mobile station is a means to receive the above-mentioned broadcast information which read the slot number which has transmitted the above-mentioned broadcast information set up by the above-mentioned base station into the above-mentioned control information, and the above-mentioned base station has transmitted in the slot of the number concerned in the slot train to receive.

[Claim 2] It is the migration communication system which carries out [ having had a means set up the slot number corresponding to / choose a desired thing out of two or more broadcast information which the above-mentioned base station provides with the above-mentioned mobile station in migration communication system according to claim 1, have a means require the broadcast information of the request which made / above-mentioned / selection on the control channel, to the above-mentioned base station, and / the broadcast information of the above-mentioned request in the above-mentioned base station into the above-mentioned control information, and ] as the description.

[Claim 3] Migration communication system characterized by providing or including the following It is a means to set the slot number to which it is the migration communication system which transmits two or more broadcast information in two or more slots to the mobile station concerned on a communication channel while a base station transmits control information in a specific slot on a control channel to one mobile station or two or more mobile stations, and the above-mentioned base station has transmitted broadcast information as an effective slot usable to a communication link. The above-mentioned mobile station is a means to receive the above-mentioned broadcast information which read the slot number which has transmitted the above-mentioned broadcast information set up into this effective slot when an usable effective slot is searched to the above-mentioned



communication link and this is received, and the above-mentioned base station has transmitted in the slot of the number concerned in the slot train to receive.

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[Translation done.]

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the migration communication system which can perform broadcast between radio stations about migration communication system.

[0002]

[Description of the Prior Art] While high advancement in information technology progresses in recent years, the migration communication system which was excellent in a sex and functionality instancy attracts attention, and \*\*, such as a cellular phone, a land mobile radiotelephone, and MCA (Multi-Channel Access) wireless, are realized as it is also at various gestalten. furthermore -- Japan -- from 1995 -- "-- always -- anywhere -- anyone -- " -- service of PHS (Personal Handyphone System; the cordless telephone of the second generation) which is the ideal migration communication system which makes a communication link possible was started. On the other hand, the standardization of PCS (Personal Communications Service) is advancing even in the U.S. If PCS is early, it is the Personal Communication Service by which initiation of service is scheduled also for 1997, and as compared with radiotelephony of the conventional cellular phone etc., a user is enabled to access communication networks, such as the existing PSTN (Public Switched Telephone Network : public telephone switched network), by low cost, it was designed so that service of access to a database etc. could be used easily, and an interface current [ seven kinds of ] is due to be adopted. The interface currently seen as a hopeful in it is PACS (Personal Access Communication System). PACS is designed based on PHS of WACS (Wireless-Access-Communication System) and Japan which Bellcore developed. A 1.9GHz band is used as a radio frequency band, and 300kHz is used as frequency spacing. As an access method, moreover, a TDMA (Time Division Multiple Access: time division multiple access) method, As a transmission system, a FDD (Frequency Division Duplex: frequency division) method, It aims at a DQPSK (Differential Quadrature Phase ShiftKeying) method being used as a modulation technique, and realizing by low cost as a thing for application with migratory [ low ] in a small cel.

[0003] By the way, there is a case where he wants to transmit the same contents to coincidence from a base station to two or more mobile stations like a teletext when employing migration communication system. In such a case, the so-called

broadcast method will be used. As an example of this broadcast method, to JP,7-107032,A When a master station (base station) receives the demand of the multiple address message from a slave station (mobile station) The technique which carries out the radio relay of the multiple address message signal to all the slave stations in a group (that is, it is all the slave stations with which the location is registered into the wireless zone which this master station takes charge of, and mobile communication is presented, and the identification number is respectively given to each slave station) is indicated. Drawing 8 (a) It is drawing showing the broadcast control sequence of the radio communications system which exchanges a protocol on layer 3 level indicated by this official report.

[0004] Hereafter, based on drawing, the broadcast control action of the conventional migration communication system is explained. As a channel which investigates an empty channel and is used for broadcast, a channel CH1 will be set up and a base station 1 will transmit the channel shift indication signal 4 containing the group identification number G11 to each mobile stations 21-23, if the multiple address initiation demand 3 from mobile stations 21-23 is received. By the specified channel CH1, when the communication link with a base station 1 is possible (here, mobile stations 21 and 22 shall correspond to this), each mobile station changes its communication channel to the channel (CH1), and transmits the completion signals 51 and 52 of channel shift to a base station 1. On the other hand, by the specified channel (CH1), when the communication link with a base station 1 is impossible (here, a mobile station 23 corresponds), the channel shift failure signal 53 is transmitted to a base station 1. If the channel shift directions 6 are repeated, it transmits and shift of the channel of all the mobile stations 21-23 is checked until the completion signals 71-73 of channel shift are acquired from all the mobile stations 21-23 belonging to a group G11, a base station 1 will start transmission of data 8, in order to perform broadcast.

[0005] Drawing 8 (b) The example of a format of the signal exchanged between the above-mentioned base station 1 and mobile stations 21-23 is shown. Here Divide one period into eight (one divided is called slot), and four of the first half are gone up (the direction of [ from a mobile station ] a base station). It uses as getting down from four of the second half (the direction of [ from a base station ] a mobile station), and the signal of a single frequency with which the format was defined is exchanged between the base station and the mobile station.

[0006]  
[Problem(s) to be Solved by the Invention] However, in the multiple address message method mentioned above, in order to perform broadcast at the time of broadcast, a protocol must be exchanged on layer 3 level which uses the signal of one frequency and performs sequence control between a base station and a mobile station. Since the frequency of the signal used is one, the count of an exchange of a signal will increase as compared with the PCS method using two kinds of signals with which frequencies differ by going up and going down, and the part and a communication link will take much time amount. Moreover, in the above-mentioned protocol, there are many slots beforehand reserved for call origination, a call in, location registration, etc., and since there are few intact slots, even if it can perform the demand of broadcast, from a mobile station, it

cannot be required that specific service should be specified by the mobile station side, and broadcast information should be transmitted from a base station side. Although the communication link using a frequency which goes up and is different by going down was furthermore performed by the PCS method, the concept of there having been no convention how to use an empty slot now, and performing broadcast by this method was what is not.

[0007] This invention is made in view of this present condition, and aims at obtaining the migration communication system which can improve the communication link effectiveness between a base station and a mobile station.

[0008] Moreover, specific service is specified by the mobile station side, and it aims at obtaining the migration communication system which can receive this in broadcast.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention concerning claim 1 While a base station transmits control information in a specific slot on a control channel to one mobile station or two or more mobile stations It is the migration communication system which transmits two or more broadcast information in two or more slots of a control channel to the mobile station concerned. A base station is equipped with a means to set up the slot number which has transmitted broadcast information into the above-mentioned control information. It has a means to receive the above-mentioned broadcast information which the mobile station read the slot number which has transmitted the above-mentioned broadcast information set up by the above-mentioned base station into the above-mentioned control information, and the above-mentioned base station has transmitted with the slot number concerned in the slot train to receive.

[0010] Moreover, in the above-mentioned migration communication system, a mobile station chooses a desired thing out of two or more broadcast information which a base station offers, invention concerning claim 2 is equipped with a means to require the broadcast information of the request which made [ above-mentioned ] selection on the control channel, to the above-mentioned base station, and a base station has a means set up the slot number corresponding to the broadcast information considered as a request into the above-mentioned control information, in the above-mentioned mobile station.

[0011] Moreover, while a base station transmits control information in a specific slot on a control channel to one mobile station or two or more mobile stations, invention concerning claim 3 It is the migration communication system which transmits two or more broadcast information in two or more slots to the mobile station concerned on a communication channel. A base station is equipped with a means to set the slot number which has transmitted broadcast information as an effective slot usable to a communication link. When the above-mentioned mobile station searches an usable effective slot to the above-mentioned communication link and receives this, It has a means to receive the above-mentioned broadcast information which read the slot number which has transmitted the above-mentioned broadcast information set up into this effective slot, and the above-mentioned base station has transmitted in the slot of the number concerned in the

slot train to receive.

[0012]

[Embodiment of the Invention]

Gestalt 1. drawing 1 of operation (a) It is the block diagram showing the configuration of the migration communication system in gestalt 1. of operation of this invention. In drawing 1 , three mobile stations 101-103 are arranged in the wireless zone 104 of a base station 100. The base station 100 is connected with the communication network 105 through the transmission line. Moreover, the digital communication using a bidirectional Time Division Multiple Access (TDMA) is adopted as the communication link between a base station 100 and mobile stations 101-103. Henceforth, it gets down from the direction of [ from the expedient top of explanation, and a base station 100 ] mobile stations 101-103 (downlink), and the direction of [ from mobile stations 101-103 ] a base station 100 is expressed as going up (uplink).

[0013] Next, the rough actuation between a base station and a mobile station is explained. Now, in drawing 1 , the base station 100 and the mobile station 101 shall communicate. Here, the frequency of the communication link carrier of  $f_1$  that it is going up of the frequency of the communication link carrier getting down is  $f_2$ . That is, the fixed difference is prepared in the frequency of the carrier of going down and going up, and after transmitting the carrier getting down on a frequency  $f_1$ , it consists of FDD methods in the base station 100 so that a frequency may be changed and an uphill carrier may be received on a frequency  $f_2$ . In a mobile station 101, after receiving the carrier getting down on a frequency  $f_1$ , a frequency is changed and an uphill carrier is transmitted on a frequency  $f_2$ . The slot number in this case is the  $s_1$  [ same ].

[0014] It is drawing 1 (b) that these frequencies and the relation of a slot were shown. It is 300 and 310. 300 is a slot (slot train) over the mobile stations 101-103 seen from the base station 100, and 310 is a slot (slot train) over the base station 100 seen from the mobile station 101. Although 107 shows the slot (slot) 5, this slot 5 is a specific slot which transmits control information. Mobile stations 102-103 have received the control information from a base station 100 with the slot number  $s_5$  of the communication link carrier from which a frequency  $f_1$  gets down. 109 is the slot number 1 (slot for idles) which the base station 100 is using by the communication link with a mobile station 101. Even if it sees this location from a mobile station 101, it is the same. The effective slot 108 wide opened as a thing usable to a communication link is in other slots. This effective slot 108, the slot 107 for control, the slot 109 under communication link, and the other slot (it is the slot which is not wide opened by communication link, and equivalent to slots 0, 2, 4, 6, and 7 in the slot train 300, although it is intact) that is not effective are distinguishable in unique code. The relation of each unique code is described in 200 of drawing 2 . In order that a mobile station may communicate with a base station, when performing a linkup, a mobile station carries out continuous reception of the slots 0-7 of a base station, a unique code is seen, and the effective slot which can communicate is looked for. To the timing which looked for the slot effective in this communication link, a mobile station performs intermittent transmission and reception henceforth. After a linkup is successful, a base station

also performs intermittent transmission and reception to the slot concerned.

[0015] Drawing 3 is the block diagram showing the more detailed configuration of the base station 100 shown in drawing 1 . The base station is equipped with the line control section 110, the modulation section 111, the input section 112, the communications control section 113, the radio control section 114, the output section 115, the recovery section 116, and an antenna 117 in drawing 3 . If it explains in full detail below, the above-mentioned line control section 110 will be inserted between a communication network 105 and the communications control section 113, and will control the connection condition of a circuit, and a change. The above-mentioned communications control section 113 performs broadcast control of this invention including CPU, ROM, RAM, etc. The above-mentioned input section 112 is constituted by a keyboard, the microphone, etc., and inputs data and voice into the communications control section 113. The above-mentioned output section 115 is constituted by a magnetic disk drive, a display unit, the loudspeaker, etc., and carries out the data outputted from the above-mentioned communications control section 113 for storage, a display, a voice output, etc. The above-mentioned modulation section 111 by the predetermined method, and outputs the transmit data outputted from the communications control section 113 to the radio control section 114. [ become irregular for example, ] [  $\pi/4$  shift DQPSK ] This radio control section 114 has the function to receive the signal of a predetermined frequency band out of the function which puts the modulation data given from the modulation section 111 on a subcarrier, and is transmitted from an antenna 117, and the RF signal which carried out induction to the antenna 117. The above-mentioned recovery section 116 restores to the signal received by the radio control section 114, and gives it to the communications control section 113.

[0016] Drawing 4 is the block diagram showing the more detailed configuration of the mobile station shown in drawing 1 . The mobile station is equipped with the modulation section 121, the input section 120, the communications control section 123, the radio control section 124, the output section 125, the recovery section 126, and an antenna 127 in drawing 4 . If it explains in full detail below, the above-mentioned communications control section 123 will perform broadcast control of this invention including CPU, ROM, RAM, etc. The above-mentioned input section 120 is constituted by a keyboard, the microphone, etc., and inputs data and voice into the communications control section 123. The above-mentioned output section 125 is constituted by a magnetic disk drive, a display unit, the loudspeaker, etc., and storage, a display, a voice output, etc. carry out the data outputted from the communications control section 123. The above-mentioned modulation section 121 by the predetermined method, and outputs the transmit data outputted from the communications control section 123 to the radio control section 124. [ become irregular for example, ] [  $\pi/4$  shift DQPSK ] This radio control section 124 has the function to receive the signal of a predetermined frequency band out of the function which puts the modulation data given from the modulation section 121 on a subcarrier, and is transmitted from an antenna 127, and the RF signal which carried out induction to the antenna 127. The above-mentioned recovery section 126 restores to the signal received by the radio control section 124, and gives it to the communications control section 123.

[0017] And in the above configuration, CPU which constitutes the communications control section 113 of a base station 100 is used. The function to set up the slot number which has transmitted the broadcast information concerned into control information in case broadcast information is transmitted is realized. Moreover, by realizing the function which reads the slot number which has transmitted the above-mentioned broadcast information set up by the above-mentioned base station into the above-mentioned control information using CPU which constitutes the communications control section 123 of a mobile station The slot number which has transmitted the broadcast information transmitted from the base station 100 side on the occasion of broadcast can be detected by the mobile station sides 101-103, and, thereby, broadcast information can be received.

[0018] Moreover, while being able to send out the broadcast information assignment information that choose specific broadcast information in the above-mentioned configuration using CPU which constitutes the communications control section 123 by the side of the above-mentioned mobile station 101-103, and this is specified, to a base station 100 By realizing the function to set up the slot number of the specified broadcast information into control information, based on the broadcast information assignment information transmitted from a mobile station 101-103 side using CPU which constitutes the communications control section 113 of a base station 100 While requiring transmission of specific broadcast information from a base station 100 side from a mobile station 101-103 side, it becomes possible to transmit this specific broadcast information by the base station 100 side.

[0019] Furthermore, CPU which constitutes the communications control section 113 of a base station 100 is used. Replace with a control slot the slot number used for transmission of broadcast information, and the function which sets as an effective slot and is transmitted is realized. When an usable effective slot is searched to a communication link and this is received to it using CPU which constitutes the communications control section 123 of mobile stations 101-103 at the time of synchronous establishment By reading the slot number which has transmitted the above-mentioned broadcast information set up into this effective slot, and realizing the function to receive the broadcast information by which transmission is carried out [ above-mentioned ], in the slot of the number concerned in the slot train to receive If there is broadcast information already transmitted in the cases, such as call origination, it will become possible to receive this preferentially.

[0020]

[Example]

The migration communication system by example 1. of this invention is explained using a drawing below example 1. Drawing 5 is the block diagram showing example 1. of the migration communication system concerning this invention. This has composition of the migration communication system which can transmit two or more broadcast information 508,509 in two or more slots of a control channel to the mobile station concerned while a base station 100 transmits control information 507 in a specific slot on a control channel to two or more mobile stations 101-103. The point which equips the base station 100 with the slot setting

means 510 for multiple address transmission, and, on the other hand, equips mobile stations 101-103 with the slot acquisition means 505 for multiple address reception and the multiple address reception shift means 506, respectively is the description of this example 1.

[0021] Then, this migration communication system explains the concrete control action in the case of transmitting and receiving broadcast information. A base station 100 always transmits control information 507 by the specific slot (slot5). In addition, mobile stations 101-103 shall know in advance that control information 507 will be transmitted by the specific slot (slot5). This control information 507 is usually drawing 2 (a). It has the format as shown in 200. In that head The reserve bit (0) prepared for future expansion and the code for discernment called a unique code are set up, and this unique code is drawing 2 (d). So that it may be shown the slot which is not [ the effective slot which a control slot communicates / (1110010) and ] effective in (0100111) and a communication link as for the slot under (1011000) and communication link -- as -- (0001101) it is decided. And in case this is used for arrival of the mail (the signal from a base station side should be received by the mobile station), the number of the mobile station which should receive a message, and the characteristic control information which the base station 100 has are set to this control information 507. Now, a base station 100 shall transmit broadcast information 508 by another vacant slot (slot1), and shall have transmitted another broadcast information 509 by slot7. Here, although mobile stations 101-103 know that control information 507 will be transmitted by the specific slot (slot5), as for by which slot the other broadcast information 508,509 is transmitted, they do not have a means to get to know this.

[0022] Then, when a base station 100 judges whether broadcast information is transmitted after the broadcast information transmitting initiation 500 (step 511) and it is judged with broadcast information being transmitted, broadcast information 508,509 sets up by which slot it is transmitted into control information 507 with the slot setting means 501 for multiple address transmission. The control information 507 in that case is drawing 2 (b). It has a format as shown in 201. Namely, while using the unique code (1110010) of a control slot as the unique code Drawing 2 (a) So that it can distinguish from other control information as shown in 200 etc. The slot number which is different for each [ from which a class differs ] the broadcast information service of every, respectively after filling in the pair of the slot information-element classification 1 for the multiple addresses which shows the number of types-of-services codes etc., and the contents length for the multiple addresses of slot information-element 1 which shows the die length of this types-of-services code is set as the control information field 2. And a base station 100 performs broadcast information transmission 502 in the slot concerned, and also performs control information transmission 503 by the specific slot (slot5).

[0023] In the waiting condition 504 that the mobile station 101 is, on the other hand, carrying out intermittent reception of the control information As control information 507, it has the unique code (1110010) of the above-mentioned control slot. And it is drawing 2 (b) also in it. When what has the slot information-element classification 1 for the multiple addresses as shown in 201 is detected With the



slot acquisition means 505 for multiple address reception, it judges that the base station 100 has transmitted broadcast information, and the slot for multiple address reception (slot1, slot7) set up into this control information 507 is acquired. And if judged with it being at the multiple address reception shift time (step 510), a mobile station 101 will be in the condition that broadcast information is receivable, with the broadcast information shift means 506, and the slot (for example, slot1) of the arbitration of the slot numbers concerned which carried out [ above-mentioned ] acquisition will receive broadcast information 508. Moreover, at this time, it usually passes along a mobile station 102,103, and it continues reception of control information 507.

[0024] Thus, according to this example 1., a base station 100 is equipped with the slot setting means 501 for multiple address transmission. In order to perform [ in / for the slot acquisition means 505 for multiple address reception, and the multiple address reception shift means 506 / a PCS method ] broadcast respectively in preparation for mobile stations 101-103 While transmitting control information 507 by the slot (slot5) of regular specification from a base station 100 Set up the slot number (slot1, slot7) which has transmitted broadcast information 508,509 into this control information 507, and it sets to mobile stations 101-103. The slot number which has transmitted the broadcast information set up into this control information is read. Since broadcast information was received with this slot number, two or more broadcast information is offered from a base station 100 to two or more mobile stations 101-103. Mobile stations 101-103 can receive this, the communication link effectiveness between a base station 100 and mobile stations 101-103 can be improved, and big effectiveness is acquired practical.

[0025] The migration communication system by example 2., next example 2. of this invention is explained. Drawing 6 is the block diagram showing example 2. of the migration communication system concerning this invention. This has composition of the migration communication system which can transmit two or more broadcast information 604,605 to the mobile station concerned in two or more SUOTCHI of a control channel while a base station 100 transmits control information 507 in a specific slot on a control channel to two or more mobile stations 101-103. The point which equips the base station 100 with the slot selection means 600 for multiple address transmission, and equips mobile stations 101-103 with the slot [ broadcast information assignment-cum-] acquisition means 601, respectively is the description of this example 2.

[0026] Then, this migration communication system explains the concrete control action in the case of transmitting and receiving broadcast information. A mobile station 101 has a means by which some broadcast information which a base station 100 offers can be specified. That is, the broadcast information assignment information 602 is transmitted to a base station 100 with the slot [ broadcast information assignment-cum-] acquisition means 601. The broadcast information assignment information 602 in this case is drawing 2 (c). It has a format as shown in 202. That is, while considering as the unique code (1110011) which shows that the unique code is the slot of broadcast, after filling in the pair of the slot information-element classification 2 for the multiple addresses which shows the number of types-of-services codes etc., and the contents length for the multiple

addresses of slot information-element 2 which shows the die length of this types-of-services code, the classification code (types-of-services code) of one or more broadcast information which wants to receive a mobile station 101 is set as the control information field 2. A base station 100 sets the slot number of the broadcast information concerned as control information 507 with the slot selection means 600 for multiple address transmission, when judged with what has transmitted the broadcast information which is step 511 and was already then specified from the mobile station 101 when the broadcast information assignment information 602 from a mobile station 101 is received. When judged with what, on the other hand, has not transmitted the broadcast information specified by the mobile station 101 at step 511, while transmitting the broadcast information specified from the mobile station 100 side with the usable slot number with the slot selection means 600 for multiple address transmission, the slot number of the broadcast information concerned is set as control information 507.

[0027] Henceforth, from a base station 100, it is required from a mobile station 101, and the control information 507 which comes to set up the slot number of the broadcast information 604 which transmits from this base station 100 is transmitted from it. In a mobile station 101, the slot number of the broadcast information set up into the above-mentioned control information 507 by the slot [ broadcast information assignment-cum-] acquisition means 601 in response is acquired. If judged with it being at the multiple address reception shift time (step 606), broadcast information as required for the broadcast information assignment information 602 is receivable.

[0028] Thus, according to this example 2., a base station 100 is equipped with the slot selection means 600 for multiple address transmission. Mobile stations 101-103 should be equipped with the broadcast information assignment means 601. When there is [ transmitting specific broadcast information from a mobile station by demand of a user etc., and ] a demand, in a base station 100, the slot selection means 600 for multiple address transmission sets up the slot number into control information 507. Since the demanded broadcast information was transmitted, while being able to improve the communication link effectiveness between a base station 100 and mobile stations 101-103 When there is a demand of transmission of the broadcast information of specific service from a mobile station 101-103 side, this can be transmitted as a demand and big effectiveness is acquired practical.

[0029] The migration communication system by example 3., next example 3. of this invention is explained. Drawing 7 is the block diagram showing example 3. of the migration communication system concerning this invention. This has composition of the migration communication system which can transmit two or more broadcast information 508,509 in two or more slots to the mobile station concerned on a communication channel while a base station 100 transmits control information 507 in a specific slot on a control channel to two or more mobile stations 101-103. The point which equips the base station 100 with the effective slot setting means 700, and equips mobile stations 101-103 with the effective slot acquisition means 703, respectively is the description of this example 3.

[0030] Then, this migration communication system explains the concrete control

action in the case of transmitting and receiving broadcast information. Like this example 3., when transmitting broadcast information on a communication channel, the effective slot is not necessarily transmitted from the base station 100 with the specific slot number. Therefore, when it is necessary to communicate by synchronous establishment etc., it is necessary to get to know the slot number location where an effective slot exists in continuous reception.

[0031] That is, when the call origination of a mobile station 101 etc. needs to perform synchronous establishment between a mobile station 101 and a base station 100, out of two or more slots by which the base station 100 has transmitted the mobile station 101 on a communication link carrier, the unique code is seen and the effective slot 701 which can communicate is searched (step 702). In this case, the effective slot 701 which should be searched is drawing 2 (d) as a unique code. It has the unique code (1011000) of the effective slot which is shown and which can be communicated, and is drawing 2 (a). It has a format as shown in 200.

[0032] Now, a base station 100 is drawing 2 (b) about the slot number currently used by the broadcast information transmission 502 into the effective slot 701 on a communication link carrier with the effective slot setting means 700 when it judges with having transmitted broadcast information 508,509 (step 511). As shown in 201, it sets up by filling in the pair of the slot number as a types-of-services code. Thereby, the effective slot 701 in this case is drawing 2 (b). It has a format as shown in 201. However, a unique code has the value (1011000) of the unique code of the effective slot which can communicate, as mentioned above.

[0033] On the other hand, a mobile station 101 can receive broadcast information 508,509 by receiving the above-mentioned effective slot 701 transmitted from the base station 100 in synchronous establishment, as mentioned above. To a synchronous establishment demand, a mobile station 101 namely, with the effective slot acquisition means 703 The slot number which has transmitted broadcast information into the above-mentioned effective slot 701 is drawing 2 (b). If set up in a pair of form of the types-of-services code and the slot number which are shown After acquiring the slot number for this broadcast information reception, it becomes possible to judge (step 704), to shift to multiple address reception with the multiple address reception shift means 506, and to carry out multiple address reception of whether it shifts to multiple address reception.

[0034] Thus, according to this example 3., a base station 100 is equipped with the effective slot setting means 700. Mobile stations 101-103 should be equipped with the effective slot acquisition means 703, respectively. A base station 100 It transmits to the effective slot 701 by setting up the slot number currently used by broadcast information transmission. When synchronous establishment needs to be performed with a base station 100 by the call origination of a mobile station 101 etc. First, when a mobile station 101 searched an effective slot and this was received, were set up into this effective slot. The slot number which has transmitted broadcast information is acquired with the effective slot acquisition means 703. Since it constituted from a slot of the number concerned in the slot train to receive so that the broadcast information 508,509 which the base station 100 has transmitted might be received While being able to improve the

communication link effectiveness between a base station 100 and mobile stations 100-103 When broadcast is transmitted at the time of synchronous establishment with the base stations 100, such as call origination, this can be received preferentially and information useful for a local station can be received efficiently, and it becomes an effective means when aiming at improvement in service for a mobile station.

[0035] In addition, although the above-mentioned example explained the case where it was adapted for a PACS method in this invention, this invention is not restricted to this format, and it is applicable [ this invention ] even if it is the thing of other methods, if an access method is a TDMA method.

[0036]

[Effect of the Invention] As mentioned above, according to the migration communication system concerning this invention, a base station performs two or more multiple address transmission by the empty slot on a control channel or a communication channel. It is possible to acquire the slot number for a subordinate's mobile station to receive broadcast information by demand of a user etc. from the control information on a control channel or the effective slot information in which the communication link on a communication channel is possible, and to receive broadcast information. Moreover, a mobile station side can require the broadcast information of specific service from a base station, and the migration communication system which can notify the slot corresponding to the broadcast information concerned from a base station side can be obtained.

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TECHNICAL FIELD

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[Field of the Invention] Especially this invention relates to the migration communication system which can perform broadcast between radio stations about migration communication system.

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## PRIOR ART

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[Description of the Prior Art] While high advancement in information technology progresses in recent years, the migration communication system which was excellent in a sex and functionality instancy attracts attention, and \*\*, such as a cellular phone, a land mobile radiotelephone, and MCA (Multi-Channel Access) wireless, are realized as it is also at various gestalten. furthermore -- Japan -- from 1995 -- "-- always -- anywhere -- anyone -- " -- service of PHS (Personal Handyphone System; the cordless telephone of the second generation) which is the ideal migration communication system which makes a communication link possible was started. On the other hand, the standardization of PCS (Personal Communications Service) is advancing even in the U.S. If PCS is early, it is the Personal Communication Service by which initiation of service is scheduled also for 1997, and as compared with radiotelephony of the conventional cellular phone etc., a user is enabled to access communication networks, such as the existing PSTN (Public Switched Telephone Network : public telephone switched network), by low cost, it was designed so that service of access to a database etc. could be used easily, and an interface current [ seven kinds of ] is due to be adopted. The interface currently seen as a hopeful in it is PACS (Personal Access Communication System). PACS is designed based on PHS of WACS (Wireless-Access-Communication System) and Japan which Bellcore developed. A 1.9GHz band is used as a radio frequency band, and 300kHz is used as frequency spacing. As an access method, moreover, a TDMA (Time Division Multiple Access: time division multiple access) method, As a transmission system, a FDD (Frequency Division Duplex: frequency division) method, It aims at a DQPSK (Differential Quadrature Phase ShiftKeying) method being used as a modulation technique, and realizing by low cost as a thing for application with migratory [ low ] in a small cel.

[0003] By the way, there is a case where he wants to transmit the same contents to coincidence from a base station to two or more mobile stations like a teletext when employing migration communication system. In such a case, the so-called broadcast method will be used. As an example of this broadcast method, to JP,7-107032,A When a master station (base station) receives the demand of the multiple address message from a slave station (mobile station) The technique which carries out the radio relay of the multiple address message signal to all the slave stations in a group (that is, it is all the slave stations with which the location is registered into the wireless zone which this master station takes charge of, and

mobile communication is presented, and the identification number is respectively given to each slave station) is indicated. Drawing 8 (a) It is drawing showing the broadcast control sequence of the radio communications system which exchanges a protocol on layer 3 level indicated by this official report.

[0004] Hereafter, based on drawing, the broadcast control action of the conventional migration communication system is explained. As a channel which investigates an empty channel and is used for broadcast, a channel CH1 will be set up and a base station 1 will transmit the channel shift indication signal 4 containing the group identification number G11 to each mobile stations 21-23, if the multiple address initiation demand 3 from mobile stations 21-23 is received. By the specified channel CH1, when the communication link with a base station 1 is possible (here, mobile stations 21 and 22 shall correspond to this), each mobile station changes its communication channel to the channel (CH1), and transmits the completion signals 51 and 52 of channel shift to a base station 1. On the other hand, by the specified channel (CH1), when the communication link with a base station 1 is impossible (here, a mobile station 23 corresponds), the channel shift failure signal 53 is transmitted to a base station 1. If the channel shift directions 6 are repeated, it transmits and shift of the channel of all the mobile stations 21-23 is checked until the completion signals 71-73 of channel shift are acquired from all the mobile stations 21-23 belonging to a group G11, a base station 1 will start transmission of data 8, in order to perform broadcast.

[0005] Drawing 8 (b) The example of a format of the signal exchanged between the above-mentioned base station 1 and mobile stations 21-23 is shown. Here Divide one period into eight (one divided is called slot), and four of the first half are gone up (the direction of [ from a mobile station ] a base station). It uses as getting down from four of the second half (the direction of [ from a base station ] a mobile station), and the signal of a single frequency with which the format was defined is exchanged between the base station and the mobile station.

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EFFECT OF THE INVENTION

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[Effect of the Invention] As mentioned above, according to the migration communication system concerning this invention, a base station performs two or more multiple address transmission by the empty slot on a control channel or a communication channel, and a subordinate's mobile station is a demand of a user etc. The migration communication system which it is more possible than the control information on a control channel or the effective slot information in which the communication link on a communication channel is possible to acquire the slot number for receiving broadcast information, and to receive broadcast information, and a mobile station side requires the broadcast information of specific service from a base station, and can notify the slot corresponding to the broadcast information concerned from a base station side can be obtained.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, in the multiple address message method mentioned above, in order to perform broadcast at the time of broadcast, a protocol must be exchanged on layer 3 level which uses the signal of one frequency and performs sequence control between a base station and a mobile station. Since the frequency of the signal used is one, the count of an exchange of a signal will increase as compared with the PCS method using two kinds of signals with which frequencies differ by going up and going down, and the part and a communication link will take much time amount. Moreover, in the above-mentioned protocol, there are many slots beforehand reserved for call origination, a call in, location registration, etc., and since there are few intact slots, even if it can perform the demand of broadcast, from a mobile station, it cannot be required that specific service should be specified by the mobile station side, and broadcast information should be transmitted from a base station side. Although the communication link using a frequency which goes up and is different by going down was furthermore performed by the PCS method, the concept of there having been no convention how to use an empty slot now, and performing broadcast by this method was what is not.

[0007] This invention is made in view of this present condition, and aims at obtaining the migration communication system which can improve the communication link effectiveness between a base station and a mobile station.

[0008] Moreover, specific service is specified by the mobile station side, and it aims at obtaining the migration communication system which can receive this in broadcast.

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MEANS

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[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention concerning claim 1 While a base station transmits control information in a specific slot on a control channel to one mobile station or two or more mobile stations It is the migration communication system which transmits two or more broadcast information in two or more slots of a control channel to the mobile station concerned. A base station is equipped with a means to set up the slot number which has transmitted broadcast information into the above-mentioned control information. It has a means to receive the above-mentioned broadcast information which the mobile station read the slot number which has transmitted the above-mentioned broadcast information set up by the above-mentioned base station into the above-mentioned control information, and the above-mentioned base station has transmitted with the slot number concerned in the slot train to receive.

[0010] Moreover, in the above-mentioned migration communication system, a mobile station chooses a desired thing out of two or more broadcast information which a base station offers, invention concerning claim 2 is equipped with a means to require the broadcast information of the request which made [ above-mentioned ] selection on the control channel, to the above-mentioned base station, and a base station has a means set up the slot number corresponding to the broadcast information considered as a request into the above-mentioned control information, in the above-mentioned mobile station.

[0011] Moreover, while a base station transmits control information in a specific slot on a control channel to one mobile station or two or more mobile stations, invention concerning claim 3 It is the migration communication system which transmits two or more broadcast information in two or more slots to the mobile station concerned on a communication channel. A base station is equipped with a means to set the slot number which has transmitted broadcast information as an effective slot usable to a communication link. When the above-mentioned mobile station searches an usable effective slot to the above-mentioned communication link and receives this, It has a means to receive the above-mentioned broadcast information which read the slot number which has transmitted the above-mentioned broadcast information set up into this effective slot, and the above-mentioned base station has transmitted in the slot of the number concerned in the slot train to receive.

[0012]

[Embodiment of the Invention]

Gestalt 1. drawing 1 of operation (a) It is the block diagram showing the configuration of the migration communication system in gestalt 1. of operation of this invention. In drawing 1 , three mobile stations 101-103 are arranged in the wireless zone 104 of a base station 100. The base station 100 is connected with the communication network 105 through the transmission line. Moreover, the digital communication using a bidirectional Time Division Multiple Access (TDMA) is adopted as the communication link between a base station 100 and mobile stations 101-103. Henceforth, it gets down from the direction of [ from the expedient top of explanation, and a base station 100 ] mobile stations 101-103 (downlink), and the direction of [ from mobile stations 101-103 ] a base station 100 is expressed as going up (uplink).

[0013] Next, the rough actuation between a base station and a mobile station is explained. Now, in drawing 1 , the base station 100 and the mobile station 101 shall communicate. Here, the frequency of the communication link carrier of  $f_1$  that it is going up of the frequency of the communication link carrier getting down is  $f_2$ . That is, the fixed difference is prepared in the frequency of the carrier of going down and going up, and after transmitting the carrier getting down on a frequency  $f_1$ , it consists of FDD methods in the base station 100 so that a frequency may be changed and an uphill carrier may be received on a frequency  $f_2$ . In a mobile station 101, after receiving the carrier getting down on a frequency  $f_1$ , a frequency is changed and an uphill carrier is transmitted on a frequency  $f_2$ . The slot number in this case is the  $s_1$  [ same ].

[0014] It is drawing 1 (b) that these frequencies and the relation of a slot were shown. It is 300 and 310. 300 is a slot (slot train) over the mobile stations 101-103 seen from the base station 100, and 310 is a slot (slot train) over the base station 100 seen from the mobile station 101. Although 107 shows the slot (slot) 5, this slot 5 is a specific slot which transmits control information. Mobile stations 102-103 have received the control information from a base station 100 with the slot number  $s_5$  of the communication link carrier from which a frequency  $f_1$  gets down. 109 is the slot number 1 (slot for idles) which the base station 100 is using by the communication link with a mobile station 101. Even if it sees this location from a mobile station 101, it is the same. The effective slot 108 wide opened as a thing usable to a communication link is in other slots. This effective slot 108, the slot 107 for control, the slot 109 under communication link, and the other slot (it is the slot which is not wide opened by communication link, and equivalent to slots 0, 2, 4, 6, and 7 in the slot train 300, although it is intact) that is not effective are distinguishable in unique code. The relation of each unique code is described in 200 of drawing 2 . In order that a mobile station may communicate with a base station, when performing a linkup, a mobile station carries out continuous reception of the slots 0-7 of a base station, a unique code is seen, and the effective slot which can communicate is looked for. To the timing which looked for the slot effective in this communication link, a mobile station performs intermittent transmission and reception henceforth. After a linkup is successful, a base station also performs intermittent transmission and reception to the slot concerned.

[0015] Drawing 3 is the block diagram showing the more detailed configuration of the base station 100 shown in drawing 1 . The base station is equipped with the line control section 110, the modulation section 111, the input section 112, the communications control section 113, the radio control section 114, the output section 115, the recovery section 116, and an antenna 117 in drawing 3 . If it explains in full detail below, the above-mentioned line control section 110 will be inserted between a communication network 105 and the communications control section 113, and will control the connection condition of a circuit, and a change. The above-mentioned communications control section 113 performs broadcast control of this invention including CPU, ROM, RAM, etc. The above-mentioned input section 112 is constituted by a keyboard, the microphone, etc., and inputs data and voice into the communications control section 113. The above-mentioned output section 115 is constituted by a magnetic disk drive, a display unit, the loudspeaker, etc., and carries out the data outputted from the above-mentioned communications control section 113 for storage, a display, a voice output, etc. The above-mentioned modulation section 111 by the predetermined method, and outputs the transmit data outputted from the communications control section 113 to the radio control section 114. [ become irregular for example, ] [  $\pi$  / ] [ 4 shift DQPSK ] This radio control section 114 has the function to receive the signal of a predetermined frequency band out of the function which puts the modulation data given from the modulation section 111 on a subcarrier, and is transmitted from an antenna 117, and the RF signal which carried out induction to the antenna 117. The above-mentioned recovery section 116 restores to the signal received by the radio control section 114, and gives it to the communications control section 113.

[0016] Drawing 4 is the block diagram showing the more detailed configuration of the mobile station shown in drawing 1 . The mobile station is equipped with the modulation section 121, the input section 120, the communications control section 123, the radio control section 124, the output section 125, the recovery section 126, and an antenna 127 in drawing 4 . If it explains in full detail below, the above-mentioned communications control section 123 will perform broadcast control of this invention including CPU, ROM, RAM, etc. The above-mentioned input section 120 is constituted by a keyboard, the microphone, etc., and inputs data and voice into the communications control section 123. The above-mentioned output section 125 is constituted by a magnetic disk drive, a display unit, the loudspeaker, etc., and storage, a display, a voice output, etc. carry out the data outputted from the communications control section 123. The above-mentioned modulation section 121 by the predetermined method, and outputs the transmit data outputted from the communications control section 123 to the radio control section 124. [ become irregular for example, ] [  $\pi$  / ] [ 4 shift DQPSK ] This radio control section 124 has the function to receive the signal of a predetermined frequency band out of the function which puts the modulation data given from the modulation section 121 on a subcarrier, and is transmitted from an antenna 127, and the RF signal which carried out induction to the antenna 127. The above-mentioned recovery section 126 restores to the signal received by the radio control section 124, and gives it to the communications control section 123.

[0017] And in the above configuration, CPU which constitutes the communications

control section 113 of a base station 100 is used. The function to set up the slot number which has transmitted the broadcast information concerned into control information in case broadcast information is transmitted is realized. Moreover, by realizing the function which reads the slot number which has transmitted the above-mentioned broadcast information set up by the above-mentioned base station into the above-mentioned control information using CPU which constitutes the communications control section 123 of a mobile station The slot number which has transmitted the broadcast information transmitted from the base station 100 side on the occasion of broadcast can be detected by the mobile station sides 101-103, and, thereby, broadcast information can be received.

[0018] Moreover, while being able to send out the broadcast information assignment information that choose specific broadcast information in the above-mentioned configuration using CPU which constitutes the communications control section 123 by the side of the above-mentioned mobile station 101-103, and this is specified, to a base station 100 By realizing the function to set up the slot number of the specified broadcast information into control information, based on the broadcast information assignment information transmitted from a mobile station 101-103 side using CPU which constitutes the communications control section 113 of a base station 100 While requiring transmission of specific broadcast information from a base station 100 side from a mobile station 101-103 side, it becomes possible to transmit this specific broadcast information by the base station 100 side.

[0019] Furthermore, CPU which constitutes the communications control section 113 of a base station 100 is used. Replace with a control slot the slot number used for transmission of broadcast information, and the function which sets as an effective slot and is transmitted is realized. When an usable effective slot is searched to a communication link and this is received to it using CPU which constitutes the communications control section 123 of mobile stations 101-103 at the time of synchronous establishment By reading the slot number which has transmitted the above-mentioned broadcast information set up into this effective slot, and realizing the function to receive the broadcast information by which transmission is carried out [ above-mentioned ], in the slot of the number concerned in the slot train to receive If there is broadcast information already transmitted in the cases, such as call origination, it will become possible to receive this preferentially.

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EXAMPLE

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[Example]

The migration communication system by example 1. of this invention is explained using a drawing below example 1. Drawing 5 is the block diagram showing example 1. of the migration communication system concerning this invention. This has composition of the migration communication system which can transmit two or more broadcast information 508,509 in two or more slots of a control channel to the mobile station concerned while a base station 100 transmits control information 507 in a specific slot on a control channel to two or more mobile stations 101-103. The point which equips the base station 100 with the slot setting means 510 for multiple address transmission, and, on the other hand, equips mobile stations 101-103 with the slot acquisition means 505 for multiple address reception and the multiple address reception shift means 506, respectively is the description of this example 1.

[0021] Then, this migration communication system explains the concrete control action in the case of transmitting and receiving broadcast information. A base station 100 always transmits control information 507 by the specific slot (slot5). In addition, mobile stations 101-103 shall know in advance that control information 507 will be transmitted by the specific slot (slot5). This control information 507 is usually drawing 2 (a). It has the format as shown in 200. In that head The reserve bit (0) prepared for future expansion and the code for discernment called a unique code are set up, and this unique code is drawing 2 (d). So that it may be shown the slot which is not [ the effective slot which a control slot communicates / (1110010) and ] effective in (0100111) and a communication link as for the slot under (1011000) and communication link -- as -- (0001101) it is decided. And in case this is used for arrival of the mail (the signal from a base station side should be received by the mobile station), the number of the mobile station which should receive a message, and the characteristic control information which the base station 100 has are set to this control information 507. Now, a base station 100 shall transmit broadcast information 508 by another vacant slot (slot1), and shall have transmitted another broadcast information 509 by slot7. Here, although mobile stations 101-103 know that control information 507 will be transmitted by the specific slot (slot5), as for by which slot the other broadcast information 508,509 is transmitted, they do not have a means to get to know this.

[0022] Then, when a base station 100 judges whether broadcast information is

transmitted after the broadcast information transmitting initiation 500 (step 511) and it is judged with broadcast information being transmitted, broadcast information 508,509 sets up by which slot it is transmitted into control information 507 with the slot setting means 501 for multiple address transmission. The control information 507 in that case is drawing 2 (b). It has a format as shown in 201. Namely, while using the unique code (1110010) of a control slot as the unique code Drawing 2 (a) So that it can distinguish from other control information as shown in 200 etc. The slot number which is different for each [ from which a class differs ] the broadcast information service of every, respectively after filling in the pair of the slot information-element classification 1 for the multiple addresses which shows the number of types-of-services codes etc., and the contents length for the multiple addresses of slot information-element 1 which shows the die length of this types-of-services code is set as the control information field 2. And a base station 100 performs broadcast information transmission 502 in the slot concerned, and also performs control information transmission 503 by the specific slot (slot5).

[0023] In the waiting condition 504 that the mobile station 101 is, on the other hand, carrying out intermittent reception of the control information As control information 507, it has the unique code (1110010) of the above-mentioned control slot. And it is drawing 2 (b) also in it. When what has the slot information-element classification 1 for the multiple addresses as shown in 201 is detected With the slot acquisition means 505 for multiple address reception, it judges that the base station 100 has transmitted broadcast information, and the slot for multiple address reception (slot1, slot7) set up into this control information 507 is acquired. And if judged with it being at the multiple address reception shift time (step 510), a mobile station 101 will be in the condition that broadcast information is receivable, with the broadcast information shift means 506, and the slot (for example, slot1) of the arbitration of the slot numbers concerned which carried out [ above-mentioned ] acquisition will receive broadcast information 508. Moreover, at this time, it usually passes along a mobile station 102,103, and it continues reception of control information 507.

[0024] Thus, according to this example 1., a base station 100 is equipped with the slot setting means 501 for multiple address transmission. In order to perform [ in / for the slot acquisition means 505 for multiple address reception, and the multiple address reception shift means 506 / a PCS method ] broadcast respectively in preparation for mobile stations 101-103 While transmitting control information 507 by the slot (slot5) of regular specification from a base station 100 Set up the slot number (slot1, slot7) which has transmitted broadcast information 508,509 into this control information 507, and it sets to mobile stations 101-103. The slot number which has transmitted the broadcast information set up into this control information is read. Since broadcast information was received with this slot number, two or more broadcast information is offered from a base station 100 to two or more mobile stations 101-103. Mobile stations 101-103 can receive this, the communication link effectiveness between a base station 100 and mobile stations 101-103 can be improved, and big effectiveness is acquired practical.

[0025] The migration communication system by example 2., next example 2. of

this invention is explained. Drawing 6 is the block diagram showing example 2. of the migration communication system concerning this invention. This has composition of the migration communication system which can transmit two or more broadcast information 604,605 to the mobile station concerned in two or more SUROTCI of a control channel while a base station 100 transmits control information 507 in a specific slot on a control channel to two or more mobile stations 101-103. The point which equips the base station 100 with the slot selection means 600 for multiple address transmission, and equips mobile stations 101-103 with the slot [ broadcast information assignment-cum-] acquisition means 601, respectively is the description of this example 2.

[0026] Then, this migration communication system explains the concrete control action in the case of transmitting and receiving broadcast information. A mobile station 101 has a means by which some broadcast information which a base station 100 offers can be specified. That is, the broadcast information assignment information 602 is transmitted to a base station 100 with the slot [ broadcast information assignment-cum-] acquisition means 601. The broadcast information assignment information 602 in this case is drawing 2 (c). It has a format as shown in 202. That is, while considering as the unique code (1110011) which shows that the unique code is the slot of broadcast, after filling in the pair of the slot information-element classification 2 for the multiple addresses which shows the number of types-of-services codes etc., and the contents length for the multiple addresses of slot information-element 2 which shows the die length of this types-of-services code, the classification code (types-of-services code) of one or more broadcast information which wants to receive a mobile station 101 is set as the control information field 2. A base station 100 sets the slot number of the broadcast information concerned as control information 507 with the slot selection means 600 for multiple address transmission, when judged with what has transmitted the broadcast information which is step 511 and was already then specified from the mobile station 101 when the broadcast information assignment information 602 from a mobile station 101 is received. When judged with what, on the other hand, has not transmitted the broadcast information specified by the mobile station 101 at step 511, while transmitting the broadcast information specified from the mobile station 100 side with the usable slot number with the slot selection means 600 for multiple address transmission, the slot number of the broadcast information concerned is set as control information 507.

[0027] Henceforth, from a base station 100, it is required from a mobile station 101, and the control information 507 which comes to set up the slot number of the broadcast information 604 which transmits from this base station 100 is transmitted from it. In a mobile station 101, the slot number of the broadcast information set up into the above-mentioned control information 507 by the slot [ broadcast information assignment-cum-] acquisition means 601 in response is acquired. If judged with it being at the multiple address reception shift time (step 606), broadcast information as required for the broadcast information assignment information 602 is receivable.

[0028] Thus, according to this example 2., a base station 100 is equipped with the slot selection means 600 for multiple address transmission. Mobile stations 101-



103 should be equipped with the broadcast information assignment means 601. When there is [ transmitting specific broadcast information from a mobile station by demand of a user etc., and ] a demand, in a base station 100, the slot selection means 600 for multiple address transmission sets up the slot number into control information 507. Since the demanded broadcast information was transmitted, while being able to improve the communication link effectiveness between a base station 100 and mobile stations 101-103. When there is a demand of transmission of the broadcast information of specific service from a mobile station 101-103 side, this can be transmitted as a demand and big effectiveness is acquired practical.

[0029] The migration communication system by example 3., next example 3. of this invention is explained. Drawing 7 is the block diagram showing example 3. of the migration communication system concerning this invention. This has composition of the migration communication system which can transmit two or more broadcast information 508,509 in two or more slots to the mobile station concerned on a communication channel while a base station 100 transmits control information 507 in a specific slot on a control channel to two or more mobile stations 101-103. The point which equips the base station 100 with the effective slot setting means 700, and equips mobile stations 101-103 with the effective slot acquisition means 703, respectively is the description of this example 3.

[0030] Then, this migration communication system explains the concrete control action in the case of transmitting and receiving broadcast information. Like this example 3., when transmitting broadcast information on a communication channel, the effective slot is not necessarily transmitted from the base station 100 with the specific slot number. Therefore, when it is necessary to communicate by synchronous establishment etc., it is necessary to get to know the slot number location where an effective slot exists in continuous reception.

[0031] That is, when the call origination of a mobile station 101 etc. needs to perform synchronous establishment between a mobile station 101 and a base station 100, out of two or more slots by which the base station 100 has transmitted the mobile station 101 on a communication link carrier, the unique code is seen and the effective slot 701 which can communicate is searched (step 702). In this case, the effective slot 701 which should be searched is drawing 2 (d) as a unique code. It has the unique code (1011000) of the effective slot which is shown and which can be communicated, and is drawing 2 (a). It has a format as shown in 200.

[0032] Now, a base station 100 is drawing 2 (b) about the slot number currently used by the broadcast information transmission 502 into the effective slot 701 on a communication link carrier with the effective slot setting means 700 when it judges with having transmitted broadcast information 508,509 (step 511). As shown in 201, it sets up by filling in the pair of the slot number as a types-of-services code. Thereby, the effective slot 701 in this case is drawing 2 (b). It has a format as shown in 201. However, a unique code has the value (1011000) of the unique code of the effective slot which can communicate, as mentioned above.

[0033] On the other hand, a mobile station 101 can receive broadcast information 508,509 by receiving the above-mentioned effective slot 701 transmitted from the

base station 100 in synchronous establishment, as mentioned above. To a synchronous establishment demand, a mobile station 101 namely, with the effective slot acquisition means 703 The slot number which has transmitted broadcast information into the above-mentioned effective slot 701 is drawing 2 (b). If set up in a pair of form of the types-of-services code and the slot number which are shown After acquiring the slot number for this broadcast information reception, it becomes possible to judge (step 704), to shift to multiple address reception with the multiple address reception shift means 506, and to carry out multiple address reception of whether it shifts to multiple address reception.

[0034] Thus, according to this example 3., a base station 100 is equipped with the effective slot setting means 700. Mobile stations 101-103 should be equipped with the effective slot acquisition means 703, respectively. A base station 100 It transmits to the effective slot 701 by setting up the slot number currently used by broadcast information transmission. When synchronous establishment needs to be performed with a base station 100 by the call origination of a mobile station 101 etc. First, when a mobile station 101 searched an effective slot and this was received, were set up into this effective slot. The slot number which has transmitted broadcast information is acquired with the effective slot acquisition means 703. Since it constituted from a slot of the number concerned in the slot train to receive so that the broadcast information 508,509 which the base station 100 has transmitted might be received While being able to improve the communication link effectiveness between a base station 100 and mobile stations 100-103 When broadcast is transmitted at the time of synchronous establishment with the base stations 100, such as call origination, this can be received preferentially and information useful for a local station can be received efficiently, and it becomes an effective means when aiming at improvement in service for a mobile station.

[0035] In addition, although the above-mentioned example explained the case where it was adapted for a PACS method in this invention, this invention is not restricted to this format, and it is applicable [ this invention ] even if it is the thing of other methods, if an access method is a TDMA method.

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[Translation done.]

\* NOTICES \*

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] They are the block diagram showing the configuration of the migration communication system concerning this invention, and drawing showing the frequency and the relation of a slot which are used between a base station and a mobile station.

[Drawing 2] It is drawing showing the contents of each control information for shifting to broadcast from a mobile station from a base station.

[Drawing 3] It is the block diagram showing the more detailed configuration of the base station of the migration communication system concerning this invention.

[Drawing 4] It is the block diagram showing the more detailed configuration of the mobile station of the migration communication system concerning this invention.

[Drawing 5] It is drawing for explaining example 1. of the migration communication system concerning this invention.

[Drawing 6] It is drawing for explaining example 2. of the migration communication system concerning this invention.

[Drawing 7] It is drawing for explaining example 3. of the migration communication system concerning this invention.

[Drawing 8] It is drawing showing the broadcast control sequence of the conventional migration communication system, and a format of the signal exchanged between a base station and a mobile station.

### [Description of Notations]

100 [ -- Communication network, ] -- A base station, 101-103 -- A mobile station, 104 -- A wireless zone, 105 107 -- A control slot, 108 -- The effective slot, 109 which can communicate -- During a communication link, slot, 110 -- The line control section of a base station, 111 -- The modulation section of a base station, 112 -- The input section of a base station, 113 -- The communications control section of a base station, 114 -- The radio control section of a base station, 115 -- The output section of a base station, 116 -- The recovery section of a base station, 117 -- The antenna of a base station, 120 -- The input section of a mobile station, 121 -- The modulation section of a mobile station, 123 -- The communications control section of a mobile station, 124 -- The radio control section of a mobile station, 125 -- The output section of a mobile station, 126 -- The recovery section of a mobile station, 127 -- The antenna of a mobile station, 200 [ -- The slot over the mobile station seen from the base station (train), ] -- Control information, 201

-- Control information, 202 -- Control information, 300 310 -- The slot (train), 500 to the base station seen from the mobile station -- Control information transmitting initiation, 501 -- The slot setting means for multiple address transmission, 502 -- Broadcast information transmission, 503 -- Control information transmission, 504 -- A waiting condition, 505 -- The slot acquisition means for multiple address reception, 506 -- Multiple address reception shift means, 507 -- Control information, 508,509 -- Broadcast information, 510 -- Multiple address reception shift judging step, 511 -- A broadcast information transmitting judging step, 600 -- The slot selection means for multiple address transmission, 601 -- A multiple address reception shift means, 602 -- Broadcast information assignment information, 604,605 -- Broadcast information, 606 [ -- Synchronous establishment demand effective slot retrieval, 703 / -- An effective slot acquisition means, 704 / -- Multiple address reception shift judging step. ] -- A multiple address reception shift judging step, 700 -- An effective slot setting means, 701 -- The effective slot, 702 which can communicate

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[Translation done.]

## \* NOTICES \*

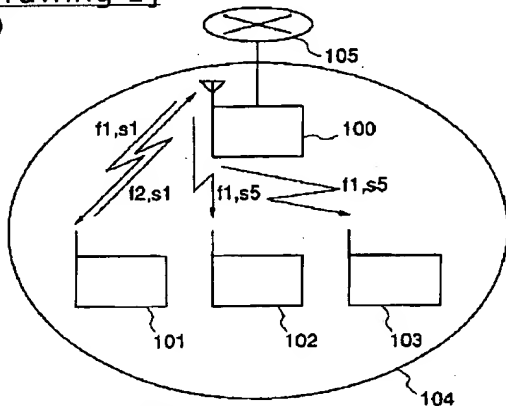
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## DRAWINGS

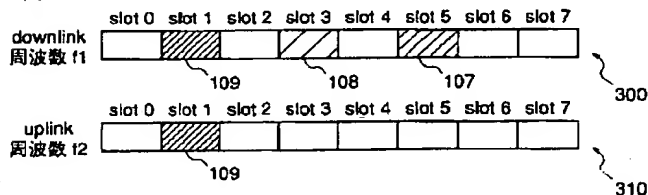
[Drawing 1]

(a)



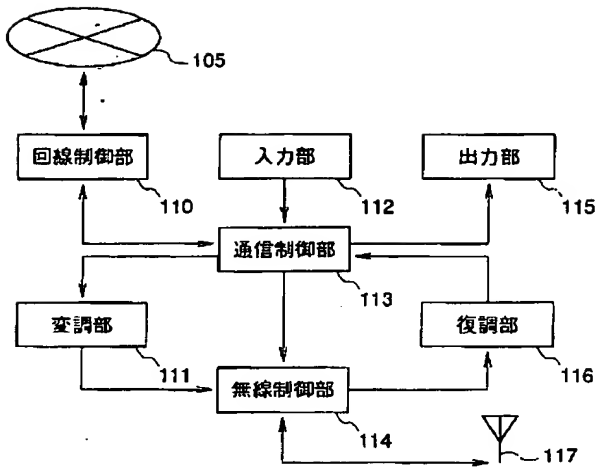
100: 基地局  
101~103: 移動局  
104: 無線ゾーン  
105: 通信網

(b)

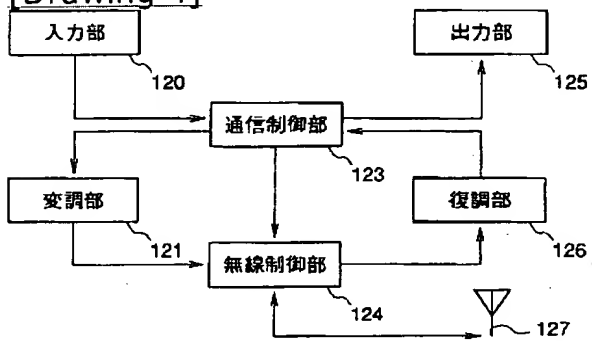


107: 制御スロット  
108: 通信可能な有効スロット  
109: 通信中スロット  
300: 基地局から見た移動局に対するスロット  
310: 移動局から見た基地局に対するスロット

[Drawing 3]



[Drawing 4]



[Drawing 2]

(a)

|   |          |
|---|----------|
| 0 | ユニークコード  |
|   | 制御情報領域 1 |
|   | 制御情報領域 1 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |
|   | 制御情報領域 2 |

200

(b)

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |

201

(c)

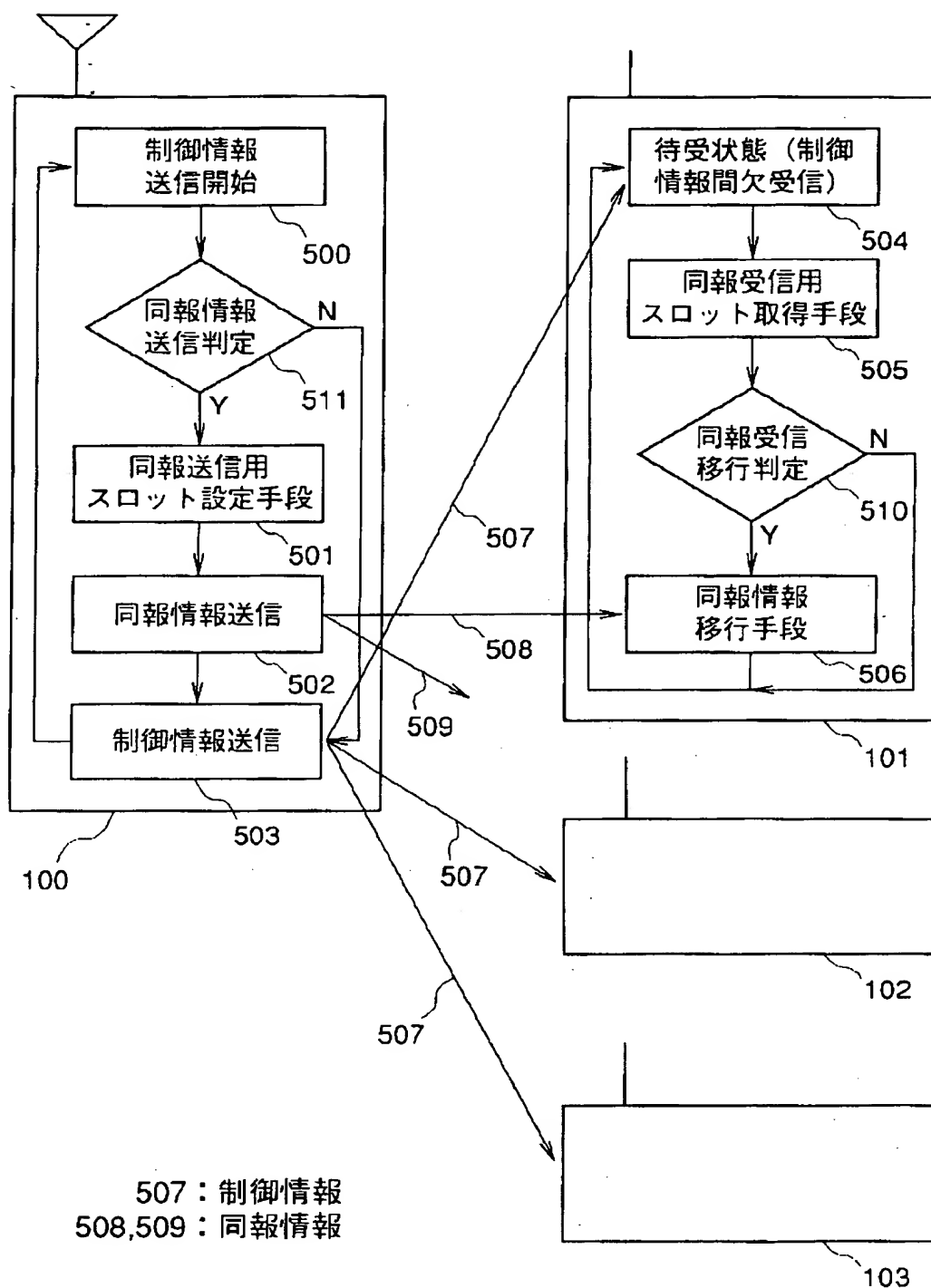
|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |

202

(d)

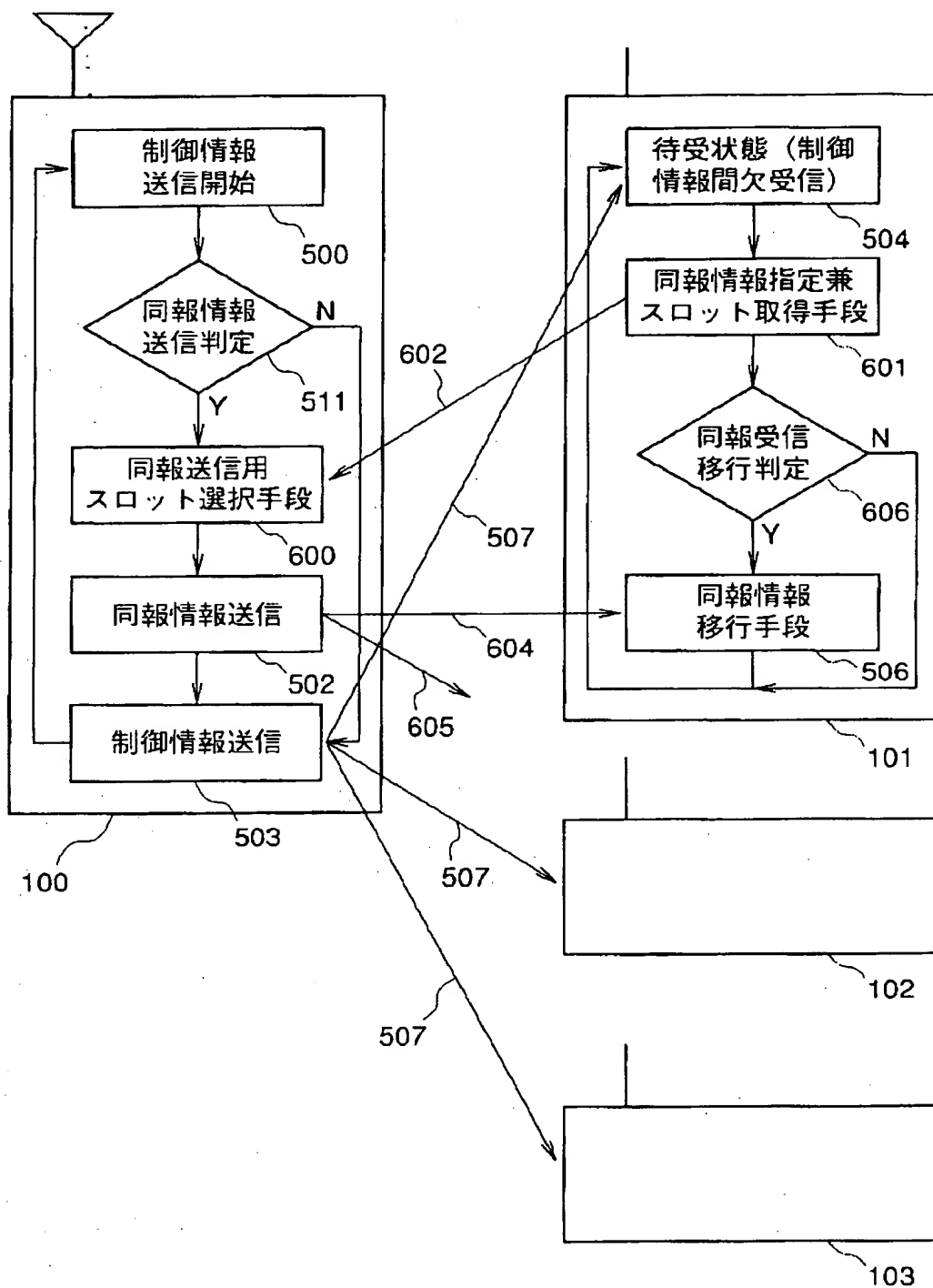
|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 0 | 1 | 0 |
|   |   |   |   |   |   |   |
| 1 | 0 | 1 | 1 | 0 | 0 | 0 |
|   |   |   |   |   |   |   |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 |
|   |   |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 1 | 0 | 1 |
|   |   |   |   |   |   |   |

[Drawing 5]

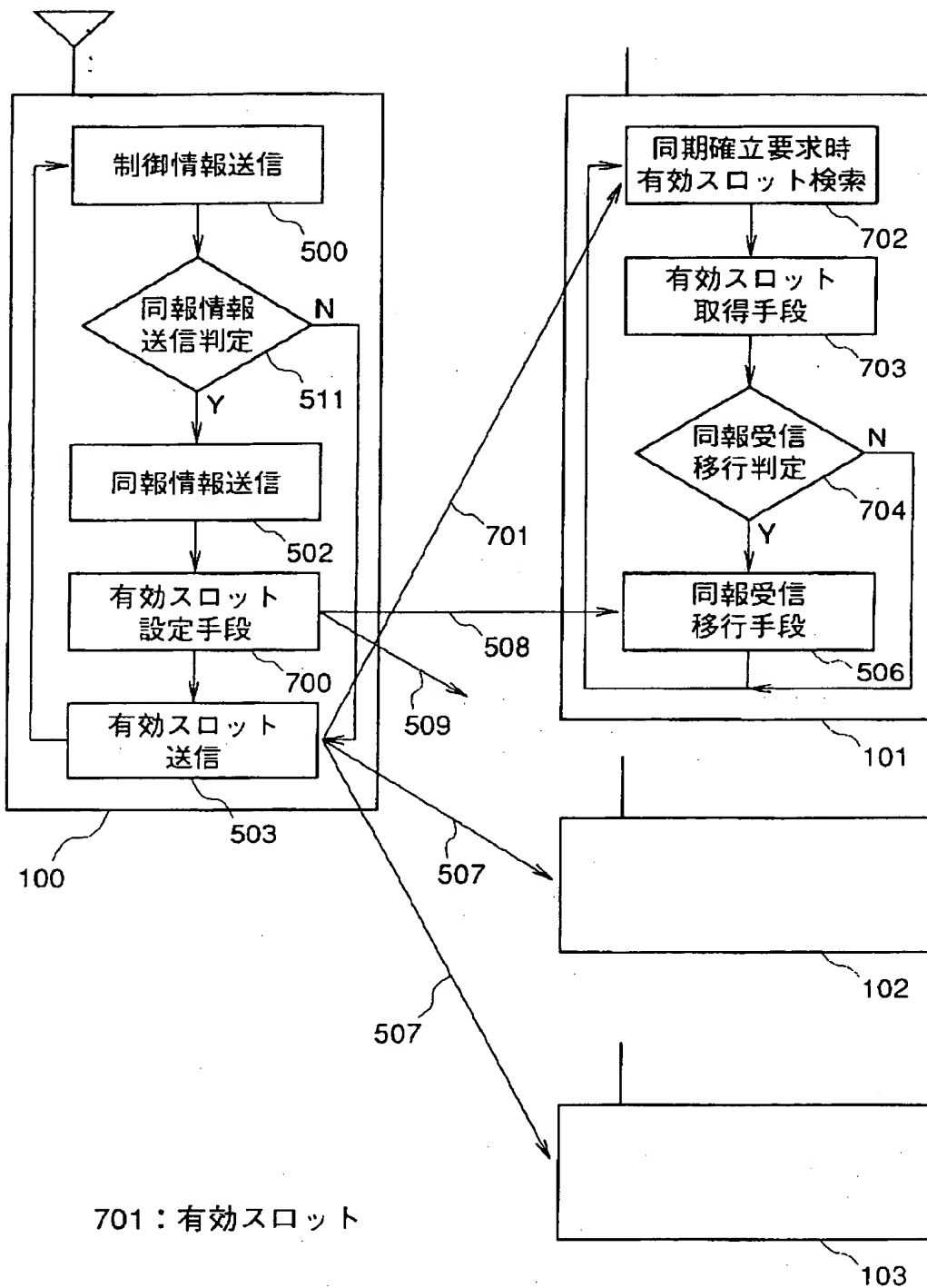


[Drawing 6]

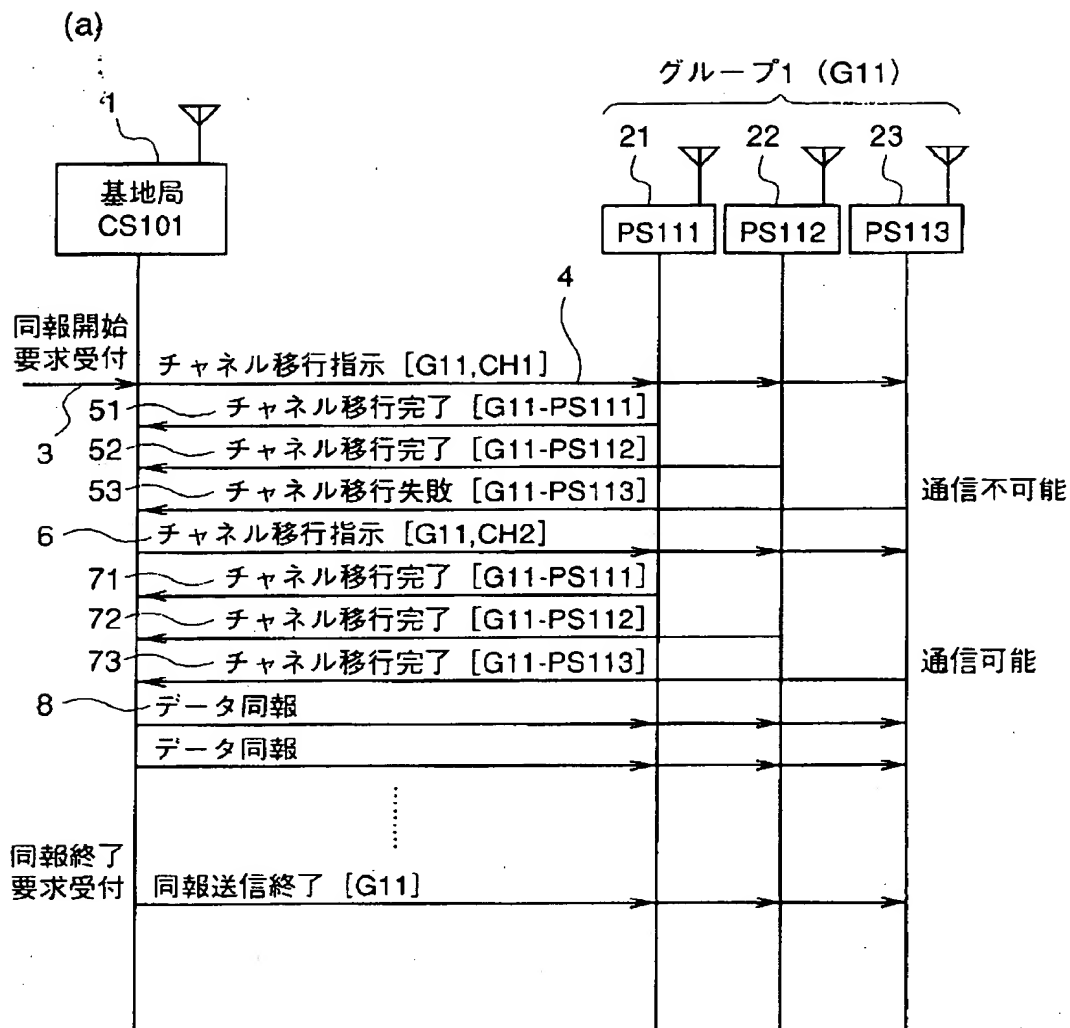




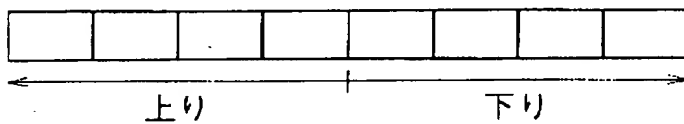
[Drawing 7]



[Drawing 8]



(b)



[Translation done.]